

REVISION OF THE NEW AUSTRALIAN GENUS *HOLASTERON* (ARANEAE: ZODARIIDAE): TAXONOMY, PHYLOGENY AND BIOGEOGRAPHY

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Baehr, B.C. 2004 06 30: Revision of the new Australian genus *Holasteron* (Araneae: Zodariidae): taxonomy, phylogeny and biogeography. *Memoirs of the Queensland Museum* **49**(2): 495-519. Brisbane. ISSN 0079-8835.

This revision of the endemic Australian zodariid *Holasteron* gen. nov. reveals 16 new species belonging to three species-groups. *H. aspinosum*-group: *H. aspinosum*, sp.nov. (♀, ♂), *H. kangaroo*, sp. nov. (♀, ♂) and *H. hirsti*, sp. nov. (♀, ♂). *H. spinosum*-group: *H. esperance*, sp. nov. (♂), *H. lumpophreysi*, sp. nov. (♀, ♂), *H. pusillum*, sp. nov. (♂), *H. reinholdae*, sp. nov. (♀, ♂) and *H. spinosum*, sp. nov. (♀, ♂). *H. aciculare*-group: *H. aciculare*, sp. nov. (♀, ♂), *H. driscotti*, sp. nov. (♀, ♂), *H. flinders*, sp. nov. (♂), *H. marliesae*, sp. nov. (♀, ♂), *H. perth*, sp. nov. (♀, ♂), *H. quemuseum*, sp. nov. (♂), *H. stirling*, sp. nov. (♀, ♂) and *H. wamuseum*, sp. nov. (♂). Both sexes were available for 11 species.

The possible relationships of the species-groups, are analysed with Hennig86, NONA and also reconstructed using the original Hennigian method. All three methods indicate that *Holasteron* gen. nov. is monophyletic and consists of three different species-groups. *H. aspinosum*-group can be seen as the basal sister-group of *H. spinosum*- and *H. aciculare* group. □ *Zodariidae, Holasteron, new species, Australia*.

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The arachnid Zodariidae is one of the most dominant ground-living spider families (Churchill, 1998) in Australia. Most species can be recognised easily by their bright yellow or orange spots on a dark brown abdomen and their white, black and orange annulated legs.

With an estimated 350-400 species, Australia has one of the richest known zodariid faunas worldwide. Only 19 species were described for the Australian continent in the first 130 years of investigation. In the last 10 years, 55 new species have been described from Baehr & Jocqué (1994, 1996, 2000), Jocqué & Baehr (1992, 2001). With funding by the Australian Biological Resources Study Participatory Program, 92 additional new species were described in the last two years (Baehr & Jocqué 2001; Baehr 2003a,b,c; Baehr & Churchill, 2003).

Holasteron gen. nov. with 16 new species, belongs to the large *Asteron*-complex (Baehr & Jocqué, 1996) first described from 2 species by Jocqué (1991).

Like all other described genera of the *Asteron*-complex, *Asteron*, *Basasteron*, *Cavasteron*, *Euasteron*, *Leptasteron*, *Minasteron*, *Pentasteron*, *Phenasteron*, *Pseudasteron*, *Subasteron*, *Spinasteron* and *Tropasteron* (Baehr 2003a,b, Baehr & Churchill, 2003, Baehr & Jocqué 2000, 2001, Jocqué 1991, Jocqué & Baehr 2001) *Holasteron*, mentioned in Baehr & Jocqué (1996) as the *Asteron howi*-group, is endemic to Australia.

MATERIAL AND METHODS

Descriptions were generated with the aid of Intkey (Dallwitz *et al.* 1998). Maps are created with Biolink version 1.5 (CSIRO Entomology, Canberra <http://www.biolink.csiro.au/>).

Drawings were done of the body, right palp and epigyne. All measurements are in millimetres. Scales of drawings are body (1mm), palp (0.5mm), epigyne (0.1 mm). Descriptions of spination and colour patterns follow that in the revision of *Euasteron* (Baehr, 2003a).

Character abbreviations: ALE, anterior lateral eyes; AME, anterior median eyes; cl/cw, carapace length/width; CD, copulatory duct; CO, copulatory opening; DTA, distal tegular apophysis (in previous papers called dorsal tegular apophysis); DtIA, dorsolateral tibial apophysis; E, embolus; EP, external prong on dorso-retrolateral tibial apophysis; IP, internal prong on dorso-retrolateral tibial apophysis; MS, retrolaterally directed, spine-shaped membrane at the base of DTA; PE, prolateral extension of DTA; PLE, posterior lateral eyes; PME, posterior median eyes; PR, prong as ventral part of RDTA; PTF, prolateral transparent field on embolus base; RDTA, retrolateral extension of DTA; RE, retrolateral extension on cymbial flange; S, spermatheca; sl/sw, sternum length/ width; SP, sperm duct; TBE, transbasal area of embolus; TF, transparent field on embolus base; VtIA, ventral tibial apophysis.

Institutional abbreviations: AM, Australian Museum, Sydney; CAS, California Academy of Science; SAM, South Australian Museum, Adelaide; QM, Queensland Museum, Brisbane; WAM, Western Australian Museum, Perth.

SYSEMATICS

Holasteron gen. nov.

TYPE SPECIES. *Holasteron aciculare* sp. nov.

ETYMOLOGY. Greek *holo-*, entire, all; this genus of the *Asteron*-complex is found in all states of Australia except the Northern Territory.

DIAGNOSIS. Apart from the characters typical for the *Asteron*-complex, species of *Holasteron* are recognised mainly by characters from the male palp (Figs 3, 7A,B, 8A,B) and also by AME being equal or larger than others (Figs 1,2). Cymbial flange with long retro-lateral extension (RE) bent inside. Cymbium with 4 or more distal spines, sperm duct (SP) weakly S-shaped, not crossing TF; embolus base elongated at least 2.5 as long as wide, with additional pro-lateral transparent field (PTF), embolus thin, semicircular, conducted by big ear-shaped DTA.

DESCRIPTION. Medium-sized spiders (2.80-7.00) with finely reticulated tegument. Carapace at frontal part broad, widest at coxae III. Profile, the highest point between fovea and PME (Fig. 1B, 2B).

Colour: Carapace yellow to sepia brown; sternum yellow to sepia brown; chelicerae yellow to medium brown; maxillae and labium pale to medium brown, distally white; abdomen medium to dark brown with or without scutum; with 1-3 pairs of white spots on anterior part and 1-3 in front of spinnerets, or with pale chevrons; laterally and ventrally pale to dark brown; legs yellow to medium brown with or without colour pattern.

Eyes (Figs 1A-C, 2A-C) in three rows (2-4-2). Only ALE in first row, AME (in the middle) and PLE in second, third only PME. AME equal to or larger than the others. Clypeus straight, between 3.6 and 4.6 times diameter of ALE high. Chilum single. Chelicerae as usual for family with a few hairs in front and dense row on distal promargin; no teeth. Maxillae and labium triangular; sparsely haired; Maxillae with anteromesal scopula, no serulla. Sternum heart-shaped with straight anterior margin, shiny or finely reticulated.

Legs with few spines on pairs I, II, more numerous on III, IV. Metatarsal preening brush on Mt II and III poorly developed. Paired tarsal claws with numerous (10-14) teeth on inner side (Fig. 4C). Unpaired claw toothless, on very small

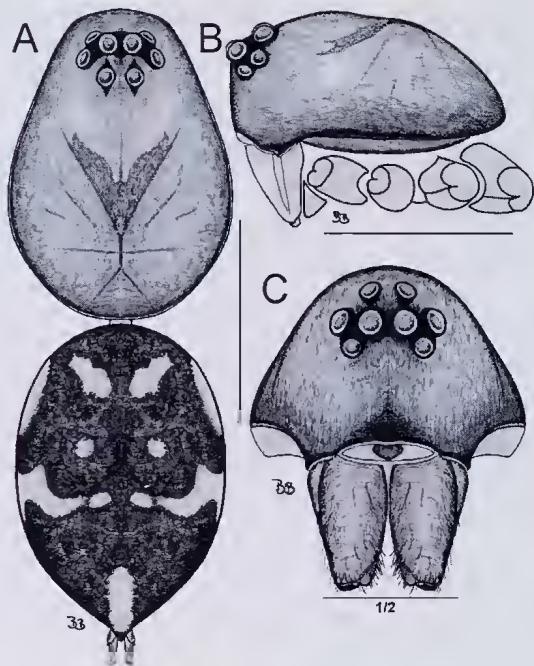


FIG. 1. *Holasteron pusillum*. A, body dorsal, B,C, carapace; B, lateral; C, frontal. Scale 1mm.

onychium. Female palpal claw strong with 5-7 teeth (Fig. 4A,D).

Abdomen oval, without sigilla. Spinnerets: AS short, conical, with very short distal segment; MS and PS tiny, situated in 1 transverse row behind AS. Colulus represented by group of setae. Tracheal spiracle slit-like covered by posterior sclerotised lip (Fig. 4B).

Male palp. (Figs 3, 7A,B) Cymbial flange with inside bent semicircular extension (RE). Cymbium with 4 or more dorsal spines, with or without retrobasal spine (Fig. 13A). With or without retro-lateral directed MS (without: *H. aspinosa*-group, well developed: *H. spinosum*- and *H. aciculare*-group); PE short (*H. spinosum*, *hirsti*-group), not reaching tibia, longer, (reaching tibia: *H. spinosum*-group) or extremely elongate (longer than cymbium and tibia in *H. aciculare*-group; RDTA with sharp tip and with or without prong, (from ventral view, tip is lying behind prong in *H. aciculare*-group); embolus base elongated with additional pro-lateral transparent field PTF connected TF distally, embolus thin, semicircular, conducted by big ear-shaped DTA; sperm duct weakly S-shaped, not crossing TF. Tibia: VTiA short or long, straight or hooked, with or without incision; DtiA, IP reduced to tiny knob, EP with distal saddle in scaled structure

(Fig. 13B). Femora with one or two strong spines dorsally.

Epigyne. (Fig. 7C,D) The basal structure of the epigyne with two lateral sickle-shaped or one semicircular CO, with or without inverted u-shaped sclerotised tubes, with few or numerous coiled CD, ending in helical sausage-shaped or ellipsoid S, is similar to the epigynes of the *Eusteron* and *Spinasteron* species.

DISTRIBUTION. SE, S and SW Australia.

KEY TO SPECIES-GROUPS AND SPECIES OF *HOLASTERON* MALES

1. Male palp without MS (Fig. 3A,B) (*H. aspinosum*-group)-2
- Male palp with MS (Fig. 3C,D) 4
2. Palp, RDTA tip tripartite, with distal and basal directed prong (Fig. 7A,B) *H. hirsti*
- Palp, RDTA with distally bent prong (Fig. 5A-D) 3
3. Palp, RDTA with basally directed tip (Fig. 5A,B) *H. kangaroo*
- Palp, RDTA with distally bent tip (Fig. 5C,D) *H. aspinosum*
4. Palp ventral view, RDTA prong not overlapping tip or absent (Fig. 8D, 10B) (*H. spinosum*-group)-5
- Palp ventral view, RDTA prong overlapping tip (Fig. 12B) (*H. aciculare*-group)-9
5. Abdomen dorsal dark brown with pale chevrons (Fig. 1,2A) 6
- Abdomen dorsal dark brown with 2 or more pairs of pale dots on top and 1 in front of the spinnerets 7
6. RDTA with only sharp tip and without prong (Fig. 8A,B) *H. pusillum*
- RDTA with sharp tip and small flattened prong (Fig. 10A,B) *H. reinholdae*
7. Legs pale without colour pattern, RDTA with only sharp tip, MS tiny (Fig. 9A,B) *H. humphreysi*
- Legs clearly annulated 8
8. Legs, femora I-IV proximal part white, distal part pale brown, MS tiny (Fig. 8C,D) *H. esperance*
- Legs, femur I dark brown with white lateral spot, II-IV proximally white distally dark brown, MS bigger (Fig. 11A,B) *H. spinosum*
9. Carapace yellow with dark cephalic area, abdomen dorsal dark brown with one pair of white spots on posterior part and one in front of the spinnerets, RDTA with big blunt prong, MS tiny (Fig. 15A,B) *H. flinders*
- Carapace orange or brown, abdomen with more than one pair of white dots or with chevrons 10
10. Cymbium with retrobasal spine (Fig. 12A, 13A) *H. aciculare*
- Cymbium without retrobasal spine (Fig. 14-19) 11
11. Palpal tibia, DtiA EP anvil-shaped (Fig. 14A, 16A) 12
- Palpal tibia, DtiA EP not anvil-shaped (Fig. 15A, 17-19) 13
12. EP with, inner edge semicircular, serrated; half way to IP with small spine (Fig. 14A) *H. driscotti*
- EP anvil-shaped, tip with internal spine. Spine and thorn in u-shaped position (Fig. 16A) *H. marliesae*
13. Carapace orange, femora I-IV pale, slightly darker distally. Palp, RDTA with slender tip (Fig. 19A,B) *H. quemuseum*
- Carapace medium or dark brown, legs clearly annulated, femora I-IV proximal part white, distal part dark brown 14
14. Abdomen with two pairs of white spots on top and one spot in front of the spinnerets. Palp, RDTA tip ventrally excavated (Fig. 19C,D) *H. wamuseum*
- Abdomen with more than two pairs of white spots on top and more than one spot in front of the spinnerets. Palp, RDTA tip ventrally not excavated (Fig. 17A,B, 18A,B) 15
15. Palp, DTA long ellipsoid (Fig. 17A,B) *H. perth*
- Palp, DTAsemicircular (Fig. 18A,B) *H. stirling*

KEY TO SPECIES OF DESCRIBED FEMALES OF *HOLASTERON*

1. Epigyne with two lateral sausage-, sickle-shaped or slit-like CO (Fig. 6, 7C,D, 9C,D, 10C,D) 2
- Epigyne, CO central, more or less semicircular (Fig. 11,12,14,16-18) 6
2. Abdomen with chevrons 3
- Abdomen with two pairs of white spots on top and one or two in front of the spinnerets 5
3. Epigyne, S long sausage-shaped (Fig. 7C,D) *H. hirsti*
- Epigyne, S small globular or helical (Fig. 6A,B, 10C,D) 4
4. S small globular (Fig. 6A,B) *H. kangaroo*
- S helical (Fig. 10C,D) *H. reinholdae*
5. CO slit-like, CD coiled 3 times, axis straight (Fig. 9C,D) *H. humphreysi*
- CD short, coiled 2 times, axis in v-shaped position (Fig. 6C,D) *H. aspinosum*
6. Femora I dark brown, with lateral white spot, II-IV proximal part white, distal part dark brown 7
- Femora I-IV proximal part white, distal part brown 8
7. Epigyne, without sclerotised tubes, CD coiled 3-4 times, axis v-shaped (Fig. 14C,D) *H. driscotti*
- Epigyne, with u-shaped sclerotised tubes, CD coiled about 6 times, axis straight (Fig. 11C,D) *H. spinosum*
8. Carapace longer than 2.70 mm, CD coiled about 12 times (Fig. 17C,D) *H. perth*
- Carapace shorter than 2.60 mm, CD coiled about or less than 9 times (Fig. 12C,D, 16C,D, 18C,D) 9
9. CO broad-oval, with u-shaped sclerotised tubes, CD coiled about 9 times (Fig. 15 A,B) *H. aciculare*
- CO broad-oval, without sclerotised tubes, CD coiled about 7 times (Fig. 16C,D, 18C,D) 10
10. CO inverted flask-shaped, (Fig. 16C,D) *H. marliesae*
- Ends of CO spiral-shaped (Fig. 18C,D) *H. stirling*

Holasteron aspinosum-group

Holasteron aspinosum sp. nov. (Figs 3A, 5C,D, 6C,D, 20)

ETYMOLOGY. Greek *a-*, without; Latin *spinosis* thorny; elongate spine-shaped membrane at the base of DTA in the male palp is absent.

MATERIAL. HOLOTYPE: Western Australia: ♂, Glenbourne farm, Spring Rd, S. of Gracetown (site 1),

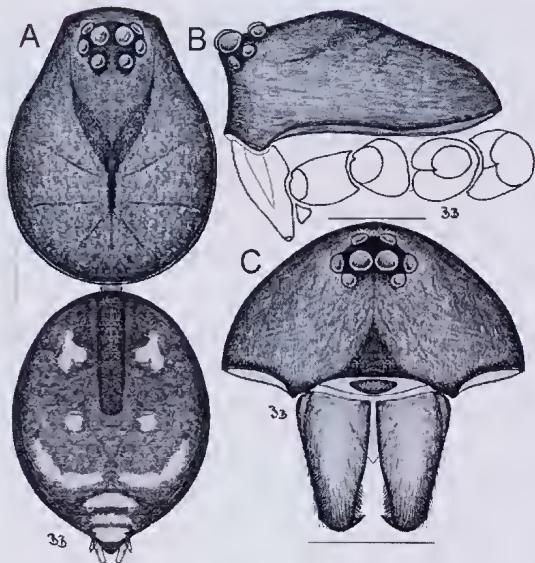


FIG. 2. *Holasteron perth*. A, body dorsal, B,C, carapace; B, lateral; C, frontal. Scale 1mm.

33°54'S, 115°00'E, 29-31 Mar. 1997, L. M. Marsh et al., dry pitfall (WAM T44601). PARATYPES: Western Australia: 3♂, 3♀, Glenbourne farm, Spring Rd., S of Gracetown, site 4-6, 33°53'S, 115°00'E, 19-31 Mar. 1997, L.M. Marsh et al., dry pitfall (WAM T44602-5); 1♂, 1♀, same data (QM S63008); 3♂, 3♀, Glenbourne farm, Spring Rd. S. of Gracetown (site 4-6), 33°54'S, 115°00'E, 18-20 Apr. 1998, L.M. Marsh et al., dry pitfall (WAM T44606-8); 1♂, Glenbourne Farm, S. of Gracetown, near pitline 5, 33°54'40"S, 115°00'34"E, 28 March 1997, J.M. Waldock, et al. (WAM T54532); 1♂, Ledge Point, Site 3, 35°01'S, 118°17'E, 20 Mar. 1985, W. Humphreys et al. (WAM93/913); 1♂, Woodman Point, 32°08'S, 115°44'E, 1 Apr. 1980, W.A.T. Biology students (WAM 90/433).

DIAGNOSIS. Apparently the western sister species of *H. kangaroo*, but can be distinguished by the colour pattern of the abdomen with 2 pairs of white spots on top and 2 in front of the spinnerets and the distally bent tip and prong of RDTA in the male palp.

DESCRIPTION. Male (holotype). 2.96 long. Carapace 1.52 long; 1.28 wide; 0.72 high; cl/cw 1.18; sternum 0.72 long; 0.76 wide; sl/sw 0.94; abdomen 1.44 long; 1.00 wide. Clypeus 0.36 high.

Colour: Carapace sepia brown, pale spots along lateral margin; sternum, chelicerae medium brown; maxillae and labium pale brown, distally white. Abdomen sepia brown, dorsally with 2 pairs of white spots on top and 2 in front of the spinnerets; laterally with 2 elongate white patches; ventrally

pale brown. Legs pale brown, clearly annulated, with darker brown lateral stripes; coxae, trochantera I-IV pale; femora I-IV proximal part white, distal part pale brown.

Eyes: AME largest, ALE smallest; eye group width 0.57 of head width; AME 0.12; ALE 0.09; PME 0.10; PLE 0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.28; AME-AME 0.26; PME-PME 0.26. Clypeus 0.36 high.

Male palp (Figs 3A, 5C,D); PE not reaching tibia; RDTA with distally bent prong; TBE broadened. VTIA short; DTIA IP tiny, EP strongly sclerotised with blunt flattened area distally.

Female (paratype). 3.76 long. Carapace 1.72 long; 1.20 wide; 0.72 high; cl/cw 1.43; sternum 0.76 long; 0.80 wide; sl/sw 0.95; abdomen 2.04 long; 1.52 wide.

Colour: As in males.

Eyes: AME largest, ALE smallest; eye group width 0.59 of head width; AME 0.12; ALE 0.09; PME 0.1; PLE 0.1; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.05; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.28; AME-AME 0.25; PME-PME 0.25.

Epigyne (Fig. 6C,D): With 2 lateral sickle-shaped CO, CD short, coiled 2 times, axis in v-shaped position, ending in basal circular S.

DISTRIBUTION. SW Western Australia (Fig. 20).

Holasteron hirsti sp. nov. (Figs 3B, 7, 20)

ETYMOLOGY. For David Hirst, curator of the spider collection, South Australian Museum.

MATERIAL. HOLOTYPE: South Australia: ♂, Ngarkat Conservation Park, 35°40'S, 140°47'E, 20Apr-15May 1999, Archie J. McArthur, pitfall (SAM NN11908). PARATYPES: South Australia: 2♂, same data as holotype (SAM NN11909-10); 16♂, Aldinga Scrub, 35°17'S, 138°28'E, 25 Mar-13 Apr. 1987, E. Matthews, J. Forster, pitfall (SAM N1992541-56); 2♂, 1♀, Gairdner-Torrens Basin, Olympic Dam site Roxby Downs, 30°27'S, 136°53'E, Mar-Jun 1987, A. Smith, pitfall (SAM N1992418-20); 4♂, 12♀, Franklin Islands, 32°27'S, 133°40'E, May 1985, B. Guerin, pitfall (SAM N1994400-15); 1♂, Hambridge Cons Park, 33°27'S, 135°56'E, Apr. 1984, B. Guerin, pitfall (SAM N1994416); 4♂, 1♀, Kangaroo Island, 1 km E Vivonne Bay, K1 Dunnart Survey, SD05, 35°58'S, 137°10'E, 1-7 Mar 1995, T. Herbert, pitfall, (SAM NN11919-23); 1♀, Kangaroo Island, 6km SW Vivonne Bay, 35°59'S, 137°10'E, 15-17 Nov. 1990, N.P.W.S. Survey (SAM N1992557); 3♂, 1♀, Kangaroo Island, Kiawarra, 1.7km SSE, 35°56'S, 137°17'E, 1-7 Mar. 1995, D. Herbert, Dunnart Survey Pitfall (SAM NN19915-18); 19♂,

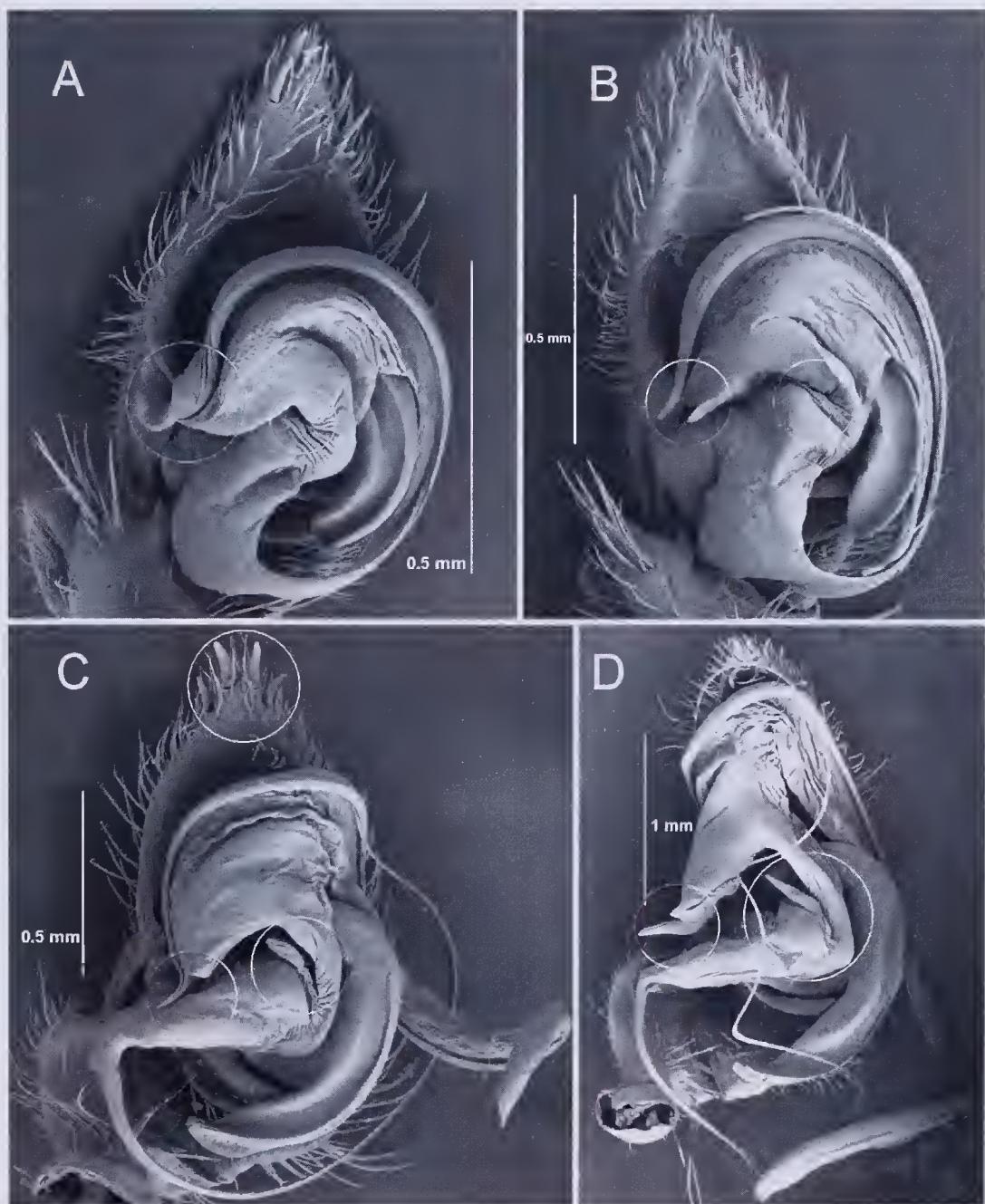


FIG. 3. *Holasteron* spp. right ♂ palps, ventral. A, *H. aspinosum*; B, *H. hirsti*; C, *H. spinosum*; D, *H. perth*.

Katarapko, Murray River NP, 34°24'S, 140°34'E, 24Apr.-1July 1991, A.J. McArthur, pitfall (SAM N1992454-72); 8♂ (SAM N199275-82); 9♂, 2♀, Keilira, 13km N, 36°35'S, 140°10'E Mar-Apr 1969, D. Hirst, pitfall (SAM N1994426-36); 4♂, Loxton 5km N, Berri 15km S, 34°24'S,

140°34'E, 1 July 1991, A.J. McArthur (SAM N199254-57); 6♂, Loxton, 20km S, 34°37'S, 140°36'E, 24Apr-31July 1991, A.J. McArthur, pitfall (SAM N1992483-88); 33♂, Loxton, 34°37'S, 140°25'E, 9 May 1991, A.J. McArthur pitfall (SAM N1992507-39); 14♂, 22.5km SW Loxton,

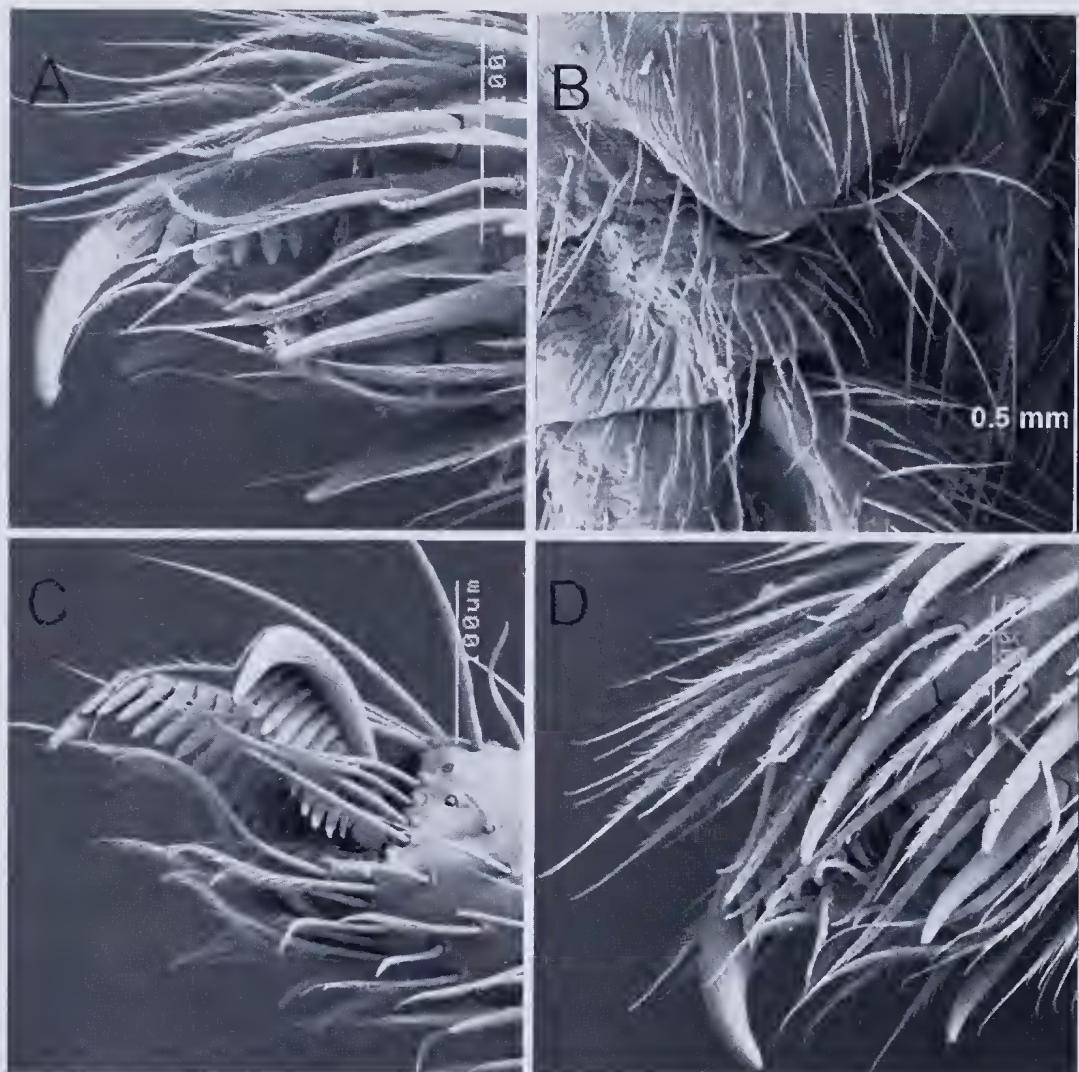


FIG. 4. *Holasteron* spp. A, *H. hirsti* ♀ right palpal claw; B-D, *H. perth*; B, tracheal spiracle; C, first right claw; D, ♀ right palpal claw.

34°37'S, 140°36'E, 28 May 1991, A.J. McArthur, pitfall (SAM N1992492-505); 3♂, Munyaroo Cons Park, 33°20'S, 137°12'E, 28 Apr 1991, W. Head, L. Jansen (SAM N1992449-51); 1♂, Pyap, 1.75km SSE, 34°27'S, 140°30'E, 17-23 June 1991, L.N. Nicolson (SAM NN1992453); 7♂. Renmark, 34°07'S, 140°37'E, 2 May-7 June 1995, K. Pullen, pitfall (QM S25271); 1♂, Yorke Peninsula, Ardrossan, towards Tiddy Widdy Beach 34°25'S, 137°55'E, 4 Apr 2002, D. Hirst (SAM NN19419); 1♂, Whyalla, 90km S, 33°51'S, 137°35'E, 8 May 1980, B.Y. Main (WAM T54608).

DIAGNOSIS. Apparently the southern sister species of the *H. aspinosum*-group, which it resembles in having a sclerotised, blunt, distally flattened EP of DTiA and a broadened TBE at the

base of the embolus in males and 2 lateral sickle-shaped CO. Males can be distinguished by the tripartite RDTA with sharp tip and bilobate prong, females by the long sausage-shaped S.

DESCRIPTION. Male (holotype). 3.28 long. Carapace 1.68 long; 1.36 wide; 0.80 high; cl/cw 1.24; sternum 0.84 long; 0.80 wide; sl/sw 1.05; abdomen 1.60 long; 1.12 wide. Clypeus 0.4 high.

Colour: Carapace brown with pale spots along lateral margin; sternum, chelicerae medium brown; maxillae and labium pale brown, distally white. Abdomen sepia brown, with pale chevrons. Legs pale brown, annulated; coxae, trochantera

I-IV pale; pale; femora I-IV proximal part white, distal part pale brown.

Eyes: AME largest; eye group width 0.62 of head width; AME 0.14; ALE 0.10; PME 0.10; PLE 0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.08; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.30; AME-AME 0.30; PME-PME 0.28. Clypeus 0.40 high.

Male palp (Figs 3B, 7A,B): PE not reaching tibia; RDTA tripartite with sharp tip and bilobate prong; VTiA short; DTiA IP tiny, EP strongly sclerotised with blunt flattened area distally.

Female (paratype). 4.04 long. Carapace 2.04 long; 1.36 wide; 0.88 high; cl/cw 1.50; sternum 0.92 long; 0.92 wide; sl/sw 1.00; abdomen 2.00 long; 1.20 wide.

Colour: As in male.

Eyes: Eye group width 0.66 of head width; AME 0.14; ALE 0.10; PME 0.10; PLE 0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.08; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.34; AME-AME 0.30; PME-PME 0.28.

Epigyne (Fig. 7C,D): With 2 small lateral sickle-shaped CO, CD short coiled 2 times in v-shaped position, ending in long sausage-shaped S.

REMARKS. There are quite pale specimens with pale carapace and with only darker cephalic and dorsal area.

DISTRIBUTION. Southern Australia (Fig. 20).

***Holasteron kangaroo* sp. nov.**
(Figs 5A,B, 6A,B, 20)

ETYMOLOGY. A noun in apposition with the type locality, Kangaroo Island.

MATERIAL. HOLOTYPE: South Australia: ♂, KI Dunnart Survey, Kangaroo Island, 3.4 km E Woodlana, 35°38'30"S, 137°22'13"E, 17-23 Mar 1995, T. Herbert, pitfall (SAM NN11911). PARATYPES: South Australia: 4♂, as for holotype (SAM NN11912-13), 1♂ same data (QM S63009); 1♀, Kangaroo Island, Dudley Conservation

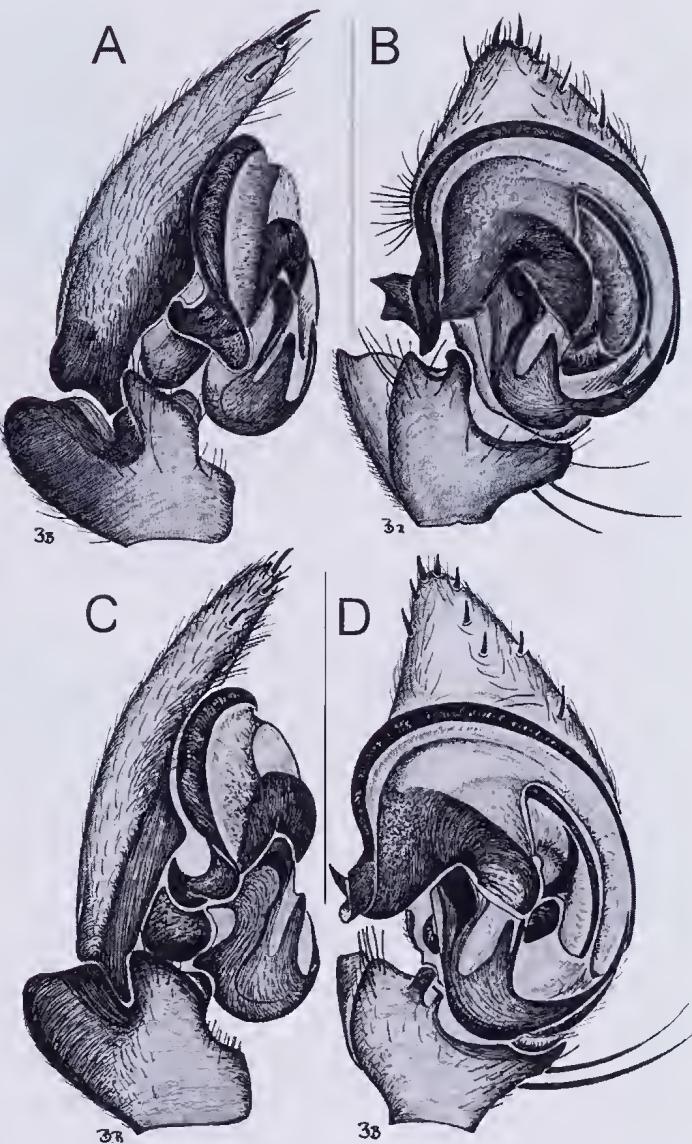


FIG. 5. *Holasteron* spp. right ♂ palps; A,C, retrolateral; B,D, ventral; A,B, *H. kangaroo*; C,D, *H. aspinosum*. Scale 0.5 mm.

Park, 11.xi.1987, D. Hirst (SAM N1992560); 1♀, same data but 12.xi.1987 (SAM N1992559).

DIAGNOSIS. Apparently the southern sister species of *H. aspinosum*, but can be distinguished by the colour pattern of the abdomen with pale chevrons dorsally and the RDTA with basally directed tip and distally bent prong.

DESCRIPTION. Male (holotype). 2.84 long. Carapace 1.48 long; 1.20 wide; 0.68 high; cl/cw 1.23; sternum 0.72 long; 0.72 wide; sl/sw 1.00;

abdomen 1.36 long; 1.00 wide. Clypeus 0.28 high.

Colour: Carapace sepia brown with pale spots along lateral margin; sternum pale brown; chelicerae medium brown; maxillae and labium pale brown, distally white. Abdomen sepia brown, with pale chevrons. Legs pale brown, clearly annulated; coxae, trochantera I-IV pale; femora I-IV proximal part white, distal part pale brown; tibia I-IV proximal and distal part with brown spot.

Eyes: AME largest, ALE smallest; eye group width 0.65 of head width; AME 0.11; ALE 0.06; PME 0.09; PLE 0.09; AME-AME 0.02; AME-ALE 0.02; PME-PME 0.06; PME-PLE 0.10; ALE-PLE 0.04; eyes group AME-PME 0.28; AME-AME 0.24; PME-PME 0.24.

Male palp (Fig. 5A,B): PE not reaching tibia; RDTA with basally directed tip and distally bent prong; TBE broadened. VTIA short, triangular; DTIA IP tiny, EP strongly sclerotised with blunt flattened distal area.

Female (paratype). 4.20 long. Carapace 1.76 long; 1.28 wide; 0.80 high; cl/cw 1.23; sternum 0.84 long; 0.8 wide; sl/sw 1.05; abdomen 2.44 long; 1.8 wide. Clypeus 0.32 high.

Colour: As in male.

Eyes: eye group width 0.62 of head width; AME 0.12; ALE 0.08; PME 0.10; PLE 0.10; AME-AME 0.01; AME-ALE 0.01; PME-PME 0.06; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.28; AME-AME 0.26; PME-PME 0.26.

Epigyne (Fig. 6A,B): With two lateral, widely sickle-shaped CO, CD short, coiled 2 times, axis in v-shaped position, ending in small, non contiguous S.

DISTRIBUTION. South Australia, Kangaroo Island (Fig. 20).

Holasteron spinosum-group

Holasteron esperance sp. nov. (Figs 8C,D, 21B)

ETYMOLOGY. A noun in apposition with the type locality.

MATERIAL. HOLOTYPE: Western Australia: ♂, Esperance Aboriginal Reserve (Part), 33°51'S, 121°51'E, 9 Nov. 1984, D. Mead-Hunter (WAM 90/244).

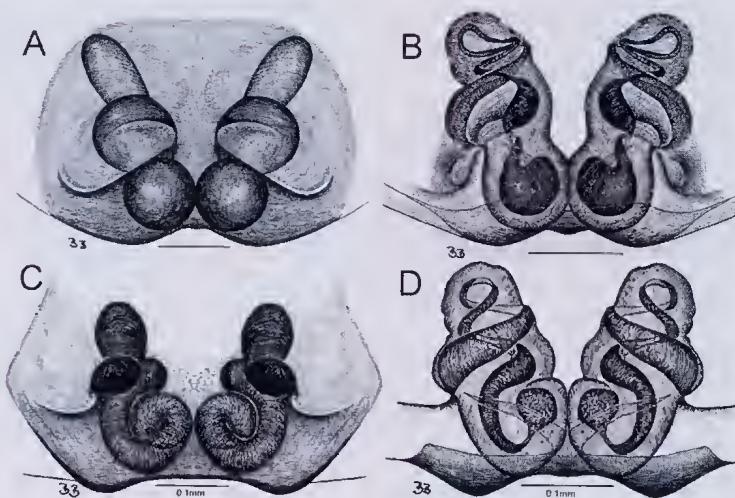


FIG. 6. *Holasteron* spp. epigyne; A,C, ventral; B,D, dorsal (cleared). A,B, *H. kangaroo*, C,D, *H. aspinosum*. Scale 0.1mm.

DIAGNOSIS. Apparently the southern sister species of *H. humphreysi*, which it resembles in having a short MS in male palps, but can be distinguished by the clearly annulated legs.

DESCRIPTION. Male (holotype). 3.36 long. Carapace 1.76 long; 1.44 wide; 0.80 high; cl/cw 1.22; sternum 0.80 long; 0.80 wide; sl/sw 1.00; abdomen 1.60 long; 1.12 wide. Clypeus 0.36 high.

Colour: Carapace, sternum, chelicerae orange; maxillae and labium yellow, distally white. Abdomen sepia brown, dorsally with two pairs of white spots on top and one spot in front of the spinnerets; laterally with one white patch. Legs pale brown, clearly annulated; coxae, trochantera I-IV pale; femora I-IV proximal part white, distal part pale brown; tibia I-IV proximal and distal part brown, medial part white.

Eyes: Nearly equal sized, AME largest; eye group width 0.57 of head width; AME 0.11; ALE 0.10; PME 0.10; PLE 0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.04; PME-PLE 0.10; ALE-PLE 0.04; eyes group AME-PME 0.28; AME-AME 0.24; PME-PME 0.24.

Male palp (Fig. 8C,D): Cymbium with 4 strong spines apically; short MS, PE reaching tibia; RDTA with sharp tip and well developed prong. VTIA short, with rounded tip; DTIA IP absent, EP as long as VTIA, with saddle.

Female unknown.

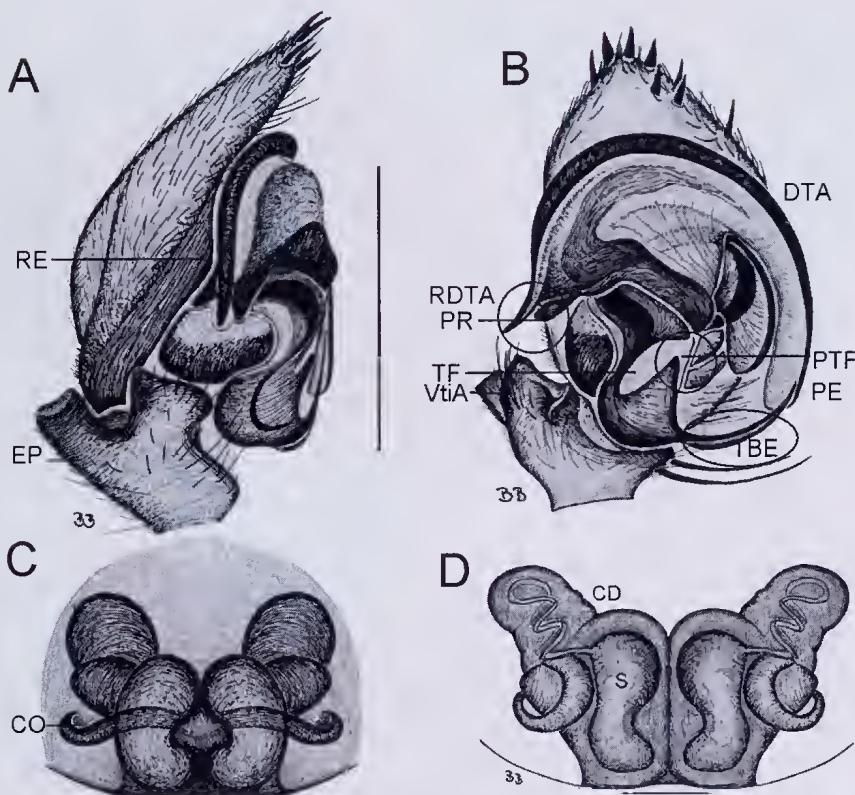


FIG. 7. *Holasteron hirsti*. A,B, right ♂ palp. A, retrolateral; B, ventral; C,D, epigyne. C, ventral; D, dorsal; CO = copulatory opening; CD = copulatory duct; DTA = dorsal tegular apophysis; E = embolus; EP = external prong on dorso-retrolateral tibial apophysis (DtiA); PE = prolateral extension of DTA; PR = prong as ventral part of RDTA; PTF = prolateral transparent field on embolus base; RDTA = retrolateral extension of DTA; RE = retrolateral extension on cymbial flange; S = spermatheca; SP = sperm duct; TBE = transbasal area of embolus; TF = transparent field on embolus base; VtiA = ventral tibial apophysis; Scale 0.5 mm, 0.1mm.

DISTRIBUTION. S Western Australia, known only from type locality (Fig. 21B).

Holasteron humphreysi sp. nov.
(Figs 9, 21A)

ETYMOLOGY. For Bill Humphreys, Western Australian Museum, one of the collectors of the types.

MATERIAL. HOLOTYPE: Western Australia: ♂, Leeman Swamp, 26°37'S, 121°18'E, 29 Aug. 1982, R.P. McMillan (WAM 90/300). PARATYPES: Western Australia: 1 ♀ allotype, Nanga Station, Carnarvon Survey, 26°33'S, 113°58'E, 11 May-30 Aug. 1995, N. Hall, pitfall (WAM T53373); 2 ♂, Nanga Station, Carnarvon Survey, 26°33'S, 113°58'E, 11 May-30 Aug. 1995, N. Hall, pitfall (WAM T44525), 1 ♂, Nanga Station, 26°35'S, 113°53'E, 11 May-30 Aug. 1995, N. Hall, pitfall (WAM T44472); 2 ♂, Leeman Swamp, 26°37'S, 121°18'E, 29 Aug. 1982, R.P. McMillan (WAM T53372); 5 ♂, Edel Land, 26°32'S, 113°32'E, 5 May-30 Aug. 1995, N. Hall, pitfall (WAM T44478-9, T44524); 1 ♂, same data (QM S63006); 3 ♂,

Boorabin, Goldfield Surveys, 31°13'S, 120°13'E, Mar. 1981, W.F. Humphreys et al., pitfall (WAM 90/66-67, 93/887); 1 ♂, Goongarrie, Goldfield Surveys, 29°54'S, 121°10'E, July 1981, W.F. Humphreys et al., pitfall (WAM 90/150); 3 ♂, Francois Peron N.P. 25°49'14"S, 113°32'24"E, 24 May-30 Aug. 1995, N. Hall pitfall (WAM T54424).

DIAGNOSIS. Apparent northwestern sister species of *H. esperance*, which it resembles in having a short MS in male palps, but can be distinguished by the pale legs without any colour pattern. Females can be distinguished by the epigyne with two lateral sausage-shaped CO, CD short, 3 times coiled, axis straight.

DESCRIPTION. Male (holotype). 3.48 long. Carapace 1.72 long; 1.36 wide; 0.84 high; cl/cw 1.26; sternum 0.84 long; 0.84 wide; sl/sw 1.00; abdomen 1.76 long; 1.36 wide. Clypeus 0.32

Colour: Carapace, chelicerae orange. Sternum yellow; maxillae and labium yellow, distally white. Abdomen sepia brown, dorsally with 2 pairs of white spots on top and 1 spot in front of spinnerets; laterally with 1 big white patch and pale booklungs. Legs pale brown. Eyes: AME largest; eye group width 0.63 of head width; AME 0.12; ALE 0.08; PME 0.08; PLE 0.08; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.10; PME-PLE 0.09; ALE-PLE 0.04; eyes group AME-PME 0.28; AME-AME 0.26; PME-PME 0.26.

Male palp (Fig. 9A,B): Cymbium with 4 strong, apical spines; short MS; PE reaching tibia; RDTA with sharp tip only; VTIA short rounded; DTIA IP reduced to tiny knob, EP as long as VTIA, with saddle.

Female (paratype). 3.56 long. Carapace 1.72 long; 1.28 wide; 0.80 high; cl/cw 1.34; sternum 0.84 long; 0.80 wide; sl/sw 1.05; abdomen 1.84 long; 1.40 wide. Clypeus 0.32 high.

Colour: As in male but faded.

Eyes: Eye group width 0.60 of head width; AME 0.11; ALE 0.08; PME 0.08; PLE 0.08; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.08; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.28; AME-AME 0.26; PME-PME 0.24.

Epigyne (Fig. 9C,D): With two lateral sausage-shaped CO, CD short, 3 times coiled, axis straight, S helical and touching medially.

REMARKS. The female is in poor condition, hence the colour pattern is faded.

DISTRIBUTION. SW Western Australia (Fig. 21A).

Holasteron pusillum sp. nov. (Figs 8A,B, 21B)

ETYMOLOGY. Latin *pusillum*, tiny.

MATERIAL. HOLOTYPE: South Australia: ♂, Poochera, Mudges, Heritage site, Nothomyrmecia search, 32°43'S, 134°50'E, 29 Oct.-7 Nov. 1995, A.J. McArthur (SAM NN11925). PARATYPES: Western Australia: 1m, Cave Entrance, Cocklebiddy Cave, 9 km S, under rock in doline, 32°00'S, 125°54'E, 3 Jan. 1972, M. Gray (AM KS15620).

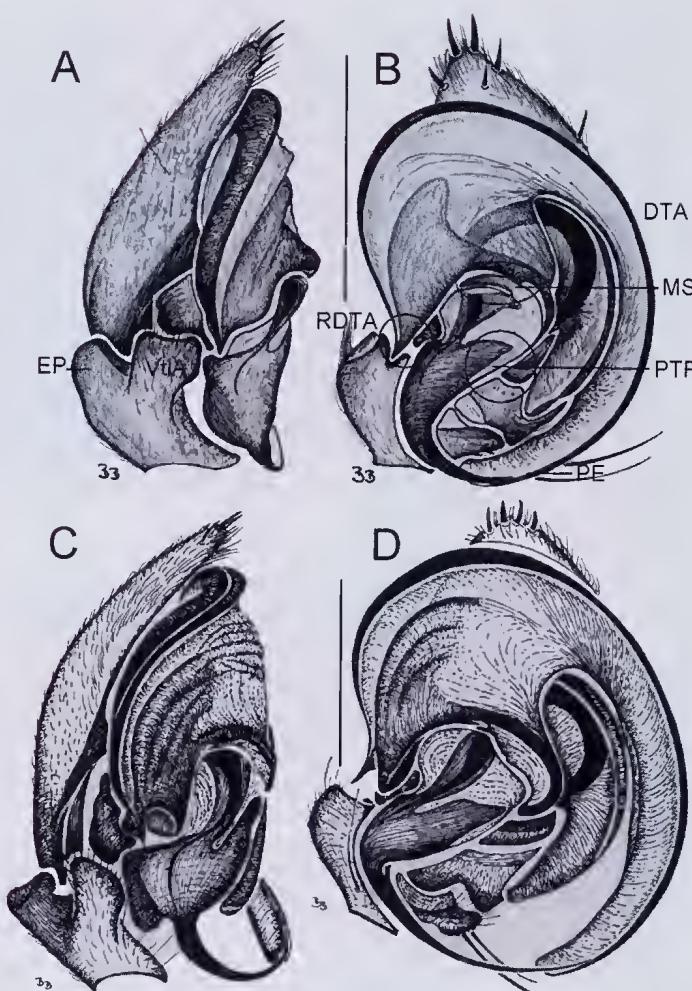


FIG. 8. *Holasteron* spp. right ♂ palps; A,C, retrolateral; B,D, ventral. A,B, *H. pusillum*; C,D, *H. esperance*. Scale 0.5 mm.

DIAGNOSIS. Smallest of the *H. spinosum*-group and can be easily recognised by the eye size with ALE smallest, all other eyes equal sized and by the RDTA with only a sharp tip and without any prong in the male palp.

DESCRIPTION. Male (holotype). 2.96 long. Carapace 1.44 long; 1.08 wide; 0.64 high; cl/cw 1.33; sternum 0.60 long; 0.60 wide; sl/sw 1.00; abdomen 1.52 long; 1.04 wide. Clypeus 0.28 high.

Colour: Carapace, sternum orange brown; chelicerae medium brown; maxillae and labium medium brown, distally white. Abdomen sepia brown, dorsally with pale chevrons; laterally with 2 elongate white patches. Legs medium brown, annulled, with darker brown lateral

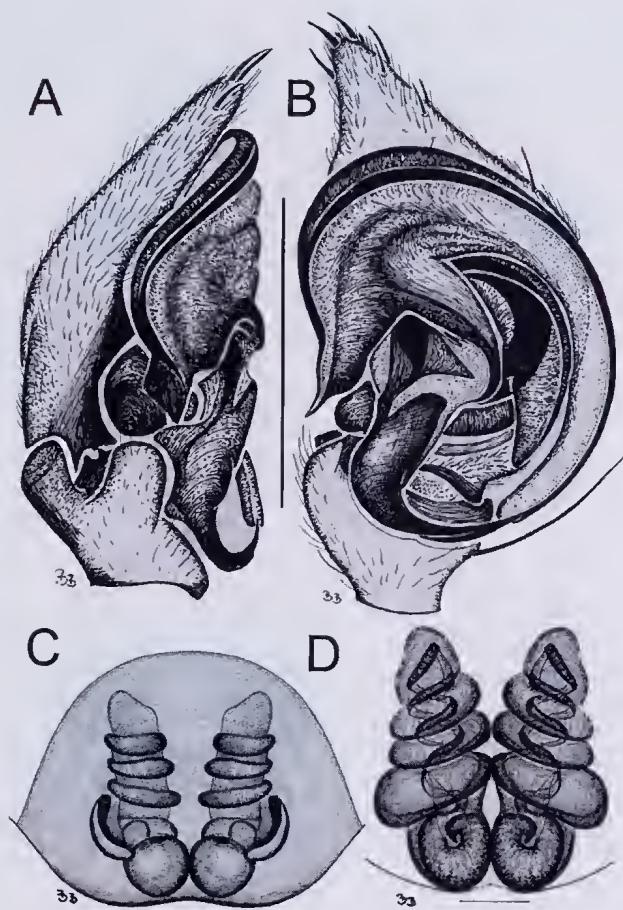


FIG. 9. *Holasteron humphreysi*. A,B, right ♂ palp. A, retro-lateral; B, ventral; C,D, epigyne, C, ventral; D, dorsal. Scale 0.5 mm, 0.1mm.

stripes; coxae and trochantera I-IV pale; femora I dark brown, II-IV proximal part white, distal part dark brown; tibiae I-IV proximally pale, distally brown.

Eyes: nearly equal sized, ALE smallest; cyc group width 0.62 of head width; AME 0.08; ALE 0.06; PME 0.08; PLE 0.08; AME-AME 0.02; AME-ALE 0.02; PME-PME 0.04; PME-PLE 0.06; ALE-PLE 0.02; eyes group AME-PME 0.22; AME-AME 0.18; PME-PME 0.20.

Male palp (Fig. 8A,B): Cymbium with 4 spines apically; elongate MS, at least 3 times as long as wide; PE reaching tibia; RDTA with sharp tip only; VTIA hooked; DTIAIP a tiny thorn, EP with blunt tip.

Female unknown.

DISTRIBUTION. Southern coastal Western Australia and South Australia (Fig. 21B).

***Holasteron reinholdae* sp. nov.**
(Figs 10, 21B)

ETYMOLOGY. For Christa Deeleman (nee Reinhold).

MATERIAL. HOLOTYPE: Western Australia: ♂, Torndirrup Nat. Pk. 35°10'S, 117°50'E, 20-27 July 1983, P.H. Dyer, J. Lyon, 2yr burn, pitfall (WAM T53351). ALLOTYPIC: Western Australia: 1 ♀, Torndirrup Nat. Pk. 35°10'S, 117°50'E, 22-29 June 1983, P.H. Dyer, J. Lyon, 2yr burn, pitfall (WAM T54531); PARATYPES: Western Australia: 8 ♂, Torndirrup Nat. Pk. 35°10'S, 117°50'E, 22-29 June 1983, P.H. Dyer, J. Lyon, 2yr burn (WAM T54658); 4 ♂, same data, 6-13 July 1983 2yr burn (WAM T54659); 14 ♂, same data, 13-20 July 2yr burn (WAM T54661); 16 ♂, same data, 20-27 July 2yr burn (WAM T54664); 4 ♂, same data, 13-20 July 17yr burn (WAM T54663); 12 ♂, same data, 13-20 July 4yr burn (WAM T54662); 1 ♂, same data, 6-13 July, 4yr burn (WAM T54660); 21 ♂, same data, 27 July-3 Aug. 1983, 2yr burn (WAM T53352); 17 ♂, same data, 4yr burn (WAM T54666); 2 ♂, same data, 20-27 July 1983, 17yr burn (WAM T54657); 1 ♂, same data, 17yr burn (QMS48697); 4 ♂, same data, 4yr burn (WAM T54665); 3 ♂, same data, 27 July-3 Aug. 1983, 17yr burn (WAM T54667); 1 ♀, 6 ♂, Callecup Hill, Warren River area, 34°37'S, 115°53'E, 29 Oct.-7 Nov. 1997, C. Deeleman, pitfall (Leiden); 1 ♂, Callecup Hill, Warren River area, 34°37'S, 115°53'E, 29 Oct.-7 Nov. 1997, C. Deeleman, pitfall (QM S60980); 1 ♂, Callecup Hill, Warren River area, 34°37'S, 115°53'E, 29 Oct.-7 Nov. 1997, C. Deeleman, pitfall (Leiden).

DIAGNOSIS. Males resemble those of *H. spinosum* and *H. pusillum* in having the long MS, three times as long as wide but can be distinguished by the abdomen with pale chevrons, the RDTA with sharp tip and small flattened prong in males, the two small lateral u-shaped CO, and the short, 2 times coiled CD with axis in v-shaped position in females.

DESCRIPTION. Male (holotype). 3.28 long. Cephalothorax 1.68 long; 1.16 wide; 0.8 high; cl/cw 1.44; sternum 0.84 long; 0.84 wide; sl/sw 1; abdomen 1.6 long; 1.16 wide. Clypeus 0.32 high.

Colour: Carapace, chelicerae and sternum medium brown; maxillae and labium medium brown, distally white. Abdomen sepia brown, with pale chevrons. Legs medium brown, annulated; coxae, trochantera I-IV pale; femora I-IV proximal part white, distal part dark brown.

Eyes: AME largest; eye group width 0.6 of head width; AME 0.1; ALE 0.08; PME 0.09; PLE 0.09; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.04; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.26; AME-AME 0.22; PME-PME 0.22.

Male palp (Fig. 10A,B): Cymbium 4 apical spines; elongate MS; PE reaching tibia; RDTA with sharp tip and small flattened prong; VTIA short, with incision; DTIA IP reduced to tiny knob, EP as long as VTIA, with saddle.

Female (paratype). 4.36 long. Cephalothorax 1.76 long; 1.24 wide; 0.8 high; cl/cw 1.41; sternum 0.84 long; 0.84 wide; sl/sw 1; abdomen 2.6 long; 2.12 wide. Clypeus 0.36 high

Colour: As in male.

Eyes: AME largest; eye group width 0.61 of head width; AME 0.12; ALE 0.1; PME 0.1; PLE 0.1; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.08; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.32; AME-AME 0.28; PME-PME 0.28.

Legs: Female palpal claw strong with 5 teeth.

Epigyne (Fig. 10C,D): With 2 small lateral u-shaped CO, CD short, 2 times coiled, axis in v-shaped position, S helical and touching medially.

REMARKS. The abdominal chevrons vary in size.

DISTRIBUTION. SW Western Australia (Fig. 21B).

Holasteron spinosum sp. nov. (Figs 11, 21A)

ETYMOLOGY. Latin *spinosis*, spiny; refers to the well developed spine-shaped membrane (MS) at the base of DTA.

MATERIAL. HOLOTYPE: South Australia: ♂, Emu, 4.5km NW, 28°38'S, 132°10'E, 11 Oct. 1976, D.C. Lee (SAM N1992448). PARATYPES: South Australia: 1♂, Patawarta Bore, Narriwa Stn., 1.3km N, 30°55'S, 138°43'E, 15-25 Mar. 1999, Flinders Ranges survey (SAM NN11938); 1♂, Arcoona Creek, Gammon Ranges, 30°26'S, 138°58'E, 2-6 May 1989, D. Hirst, J.A. Forrest (SAM NN11936); 1♂, Doongoonarra Waterhole, 6.6km SW, 28°16'S, 140°25'E, 14 Nov. 1994, R. Brandle, Stony Desert Survey, pitfall (SAM NN11956); 1♂, Hammat Dam, 1km E, 32°51'S, 139°32'E, 28 Oct. 1992, South Olary Plains Survey, pitfall (SAM NN11929); 1♂, Mt Coffin, 16km ESE Moolooloo, 30°35'S, 138°40'E, 9-20

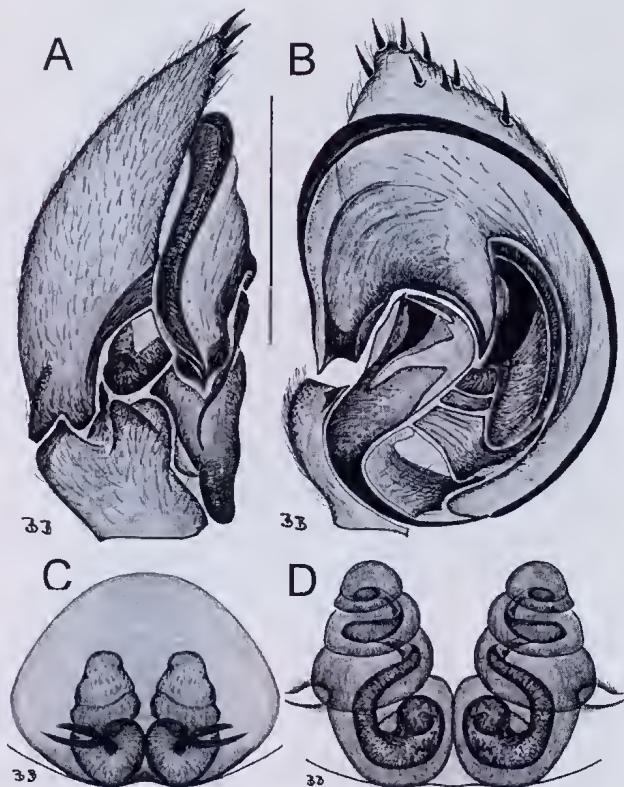


FIG. 10. *Holasteron reinholdae*. A,B, right ♂ palp. A, retrolateral; B, ventral; C,D, epigyne. C, ventral; D, dorsal. Scale 0.5 mm, 0.1 mm.

Dec. 1997, NW Flinders Ranges Survey, pitfall (SAM NN11935); 1♂, 1♀, Renmark, Calperum Station, 34°00'S, 140°45'E, 28 Mar.-4 May 1995, K.R. Pullen (QM S50681); 4♂, Central Ranges, 31.5km ENE Mimili, 26°54'S, 133°00'E, 24-31 Oct. 1998, Pitjantjatjara Lands Survey, pitfall (SAM NN11365-8); 1♂, Central Ranges, 26.3km ENE Mimili, 26°55'S, 132°57'E, 25-31 Oct. 1998, Pitjantjatjara Lands Survey, pitfall (SAM NN11364); 1♂, Central Ranges, 19.9km WNW Indulkana, 26°54'S, 133°07'E, 25-31 Oct. 1998, Pitjantjatjara Lands Survey, pitfall (SAM NN11376); 1♂, Central Ranges, 9.4km SE Maryinna Hill, 27°01'S, 131°17'E, 14-18 Mar. 1995, Pitjantjatjara Lands Survey, pitfall (SAM NN11377); 1♂, Mt Coffin, 8.3km ESE Moolooloo, 30°35'S, 138°35'E, 9-12 Dec. 1997, NW Flinders Ranges Survey, pitfall (SAM NN11934); 4♂, 2♀, 29.7km WNW Indulkana, 26°52'S, 133°02'E, 24-31 Oct. 1998, Pitjantjatjara Lands Survey, pitfall (SAM NN11369-75). Victoria: 1♂, 17 km SW of Hattah, 34°51'S, 142°08'E, Oct. 1985, A.L. Yen, pitfall (VM). Western Australia: 1♂, Fraser Range Stn., 32°04'S, 122°48'E, 22 Apr. 1995, A.F. Longbottom (WAM T44420).

DIAGNOSIS. Largest of the *H. spinosum*-group can easily be recognised by the 4 strong spines at

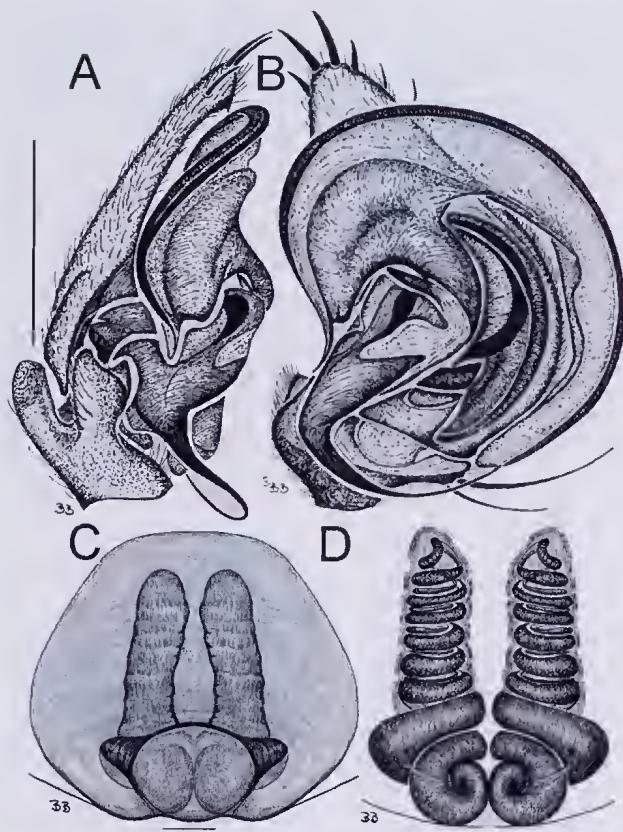


FIG. 11. *Holasteron spinosum*. A,B, right ♂ palp. A, retrolateral; B, ventral; C,D, epigyne. C, ventral; D, dorsal. Scale 0.5 mm, 0.1mm.

the end of the male palpal cymbium and the RDTA with sharp tip and small flattened prong. Females differ from other species of the *H. spinosum*-group by the broadly oval CO, with small u-shaped sclerotised tubes.

DESCRIPTION. *Male* (holotype). 4.00 long. Carapace 1.92 long; 1.44 wide; 0.72 high; cl/cw 1.33; sternum 0.84 long; 0.80 wide; sl/sw 1.05; abdomen 2.08 long; 1.56 wide. Clypeus 0.36 high.

Colour: Carapace; sternum; chelicerae sepia brown; maxillae and labium medium brown, distally white. Abdomen sepia brown, dorsally with 2 pairs of white spots on top and 1 spot in front of the spinnerets; laterally with 2 elongate white patches. Legs medium brown, annulated, with darker brown lateral stripes; coxae and trochantera I-IV pale; femora I dark brown, with white patch laterally, II-IV proximal part white,

distal part dark brown; tibiae I-IV proximally pale, distally brown.

Eyes: AME largest; eye group width 0.59 of head width; AME 0.12; ALE 0.10; PME 0.10; PLE 0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.04; ALE-PLE 0.08; eyes group AME-PME 0.3; AME-AME 0.26; PME-PME 0.26.

Male palp (Fig. 11A,B); Cymbium with 4 strong, apical spines; elongate MS; PE reaching tibia; RDTA with sharp tip and small flattened prong. VTIA with incision; DTIA IP reduced to tiny knob, EP as long as VTIA, with saddle.

Female (paratype). 6.64 long. Carapace 2.08 long; 1.52 wide; 0.84 high; cl/cw 1.34; sternum 1.00 long; 0.92 wide; sl/sw 1.08; abdomen 4.56 long; 2.28 wide. Clypeus 0.36 high.

Colour: As in male.

Eyes: AME largest; eye group width 0.55 of head width; AME 0.14; ALE 0.12; PME 0.12; PLE 0.12; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.04; ALE-PLE 0.08; eyes group AME-PME 0.34; AME-AME 0.30; PME-PME 0.30.

Epigyne (Fig. 10C,D): CO broadly oval, with small u-shaped sclerotised tubes, CD elongate, about 6 times coiled, axis straight, S helical and touching medially.

REMARKS. Abdomen of females can be twice of normal size when the female is carrying eggs as in the measured paratype.

DISTRIBUTION. S Western Australia, South Australia and north Victoria in open Acacia woodland. (Fig. 21A).

Holasteron aciculare-group

Holasteron aciculare sp. nov. (Figs 12, 13, 22)

ETYMOLOGY. Latin *aciculare*, needlelike; refers to the long, needle-shaped tip of the RDTA.

MATERIAL. HOLOTYPE: South Australia: ♂, Pyap, 1.75km SSE, 34°27'S, 140°30'E, 11 July 1990, L.N. Nicolson, pitfall (SAM NN12000). PARATYPES: South Australia: 1♂, Pyap, 1.75km SSE, 34°27'S, 140°30'E, 17-23 June 1991, L.N. Nicolson, pitfall (SAM NN12001); 1♂, Adelaide, Daw Park, 34°59'S, 138°35'E, June 1971, N. Storey (SAM NN11990); 1♂, Adelaide, Paracombe, 34°51'S, 138°47'E, 19 Oct. 1988, G. Cooper (SAM N1992278); 1♂, Adelaide, Windsor Gardens, 34°56'S,

138°36'E, 24 May 1989, D. Hirst (SAM N199265); 1♂, Eyre Peninsula, Charlton Gully, 34°33'S, 135°47'E, Nov.- Dec. 1999, L. Bebbington (SAM NN11964); 1♂, Ferries McDonald National Park, 35°13'S, 139°09'E, 19 May 1977, E.G. Matthews (SAM N199270); 8♂, Hallet Cove, 35°05'S, 138°30'E, 25 Sep. 1994, A.J. McArthur, pitfall (SAM NN1191-8); 4♂, Loxton, 22km SW, 34°34'S, 140°22'E, 1 July 1991, A.J. McArthur (SAM NN12003-6); 1♀, Loxton, 20km S, 34°37'S, 140°36'E, 9 May 1991, A.J. McArthur, pitfall (SAM N199277); 12♂, Loxton, 20km S, 34°38'S, 140°36'E, Aug.-Sept. 1991, A.J. McArthur, pitfall (SAM NN12007-19); 21♂, Loxton, 8.5km S, 34°37'S, 140°36'E, 1 July 1991, A.J. McArthur, pitfall (SAM NN12020-40); 7♂, Loxton, 5km N Katarapko, 34°24'S, 140°34'E, 1 July 1991, A.J. McArthur, pitfall (SAM NN12041-7); 1♂, Loxton, Katarapko, Murray River NP., 34°24'S, 140°34'E, Sep. 1991, A.J. McArthur, pitfall (SAM NN12002); 2♂, Loxton, 4km N, Murray River NP., 34°24'S, 140°34'E, 6 Aug. 1991, A.J. Mearthur, pitfall (SAM N1992274-5); 1♂, 1♀, Mt Lofty Ranges, Melville Gully, Belair, 35°02'S, 138°40'E, 25 Oct. 1992, A.J. McArthur, pitfall (SAM NN1982-3); 1♂, Mt Lofty Ranges, Coromandel Valley, 1km S, 35°02'S, 138°38'E, 26 Oct. 1996, L.N. Nicolson (SAM NN11979); 2♂, Mt Lofty Ranges, 1km S Coromandel Valley, 35°02'S, 138°38'E, 18 Oct. 1984, L.N. Nicolson (SAM NN11976-7); 1♂, Mt Lofty Ranges, Coromandel Valley, 35°02'S, 138°38'E, Dec. 1998, L.N. Nicolson (SAM NN11981); 1♂, Mt Lofty Ranges, Coromandel Valley, 0.8km SSW, 35°02'S, 138°38'E, 7 Dec. 1998, L.N. Nicolson (SAM NN119404); 1♂, Mt Lofty Ranges, 1km S Coromandel Valley P.O., 35°02'S, 138°38'E, 6-20 Dec. 1993, L.N. Nicolson (SAM NN11978); 1♂, Mt Lofty Ranges, Coromandel Valley, 35°02'S, 138°38'E, 6-20 Dec. 1993, L.N. Nicolson (SAM NN11980); 1♂, Mt Lofty Range, Aldgate, 35°01'S, 138°44'E, Apr. 1969, A.W. Forbes (SAM N1992269); 1♂, Murray Bridge, 35°07'S, 139°16'E, 26 July 1998, M. Ludewigs (SAM NN11974); 1♂, Salisbury, 34°46'S, 138°39'E, A.J. McArthur, Nastee, pitfall (SAM NN11999); 2♂, Wild Horse Plains, 34°21'S, 138°18'E, 1-27 June 1956, O.S. Martin (SAM N199272-3); New South Wales: 1♂, Glencoe, New South Wales, 29°56'S, 151°44'E, 29 Nov. 1962, E.S. Ross, D.Q. Cavagnaro, CAS; 1♂, Gilgurra State Forest, Rivertree Fire trail, on ridge approx 2km NNE from turnoff, 28°45'S, 152°15'E, 4 Feb.-9 April 1993, M.Gray, G. Cassis, pitfall (AM KS36246); 1♂, Hazelbrook, end of Mount View Ave, 33°43'S, 150°28'E, 3 Oct. 1996, AMBS, pitfall (AM KS55662); 6♂, Narrabeen, Jamieson Park, 33°43'S, 151°18'E, 6-20 Nov. 1995, M. Gray, H. Smith, pitfall (AM KS44494, KS49064); 1♂, Ramomie State Forest, 150m, 29°43'S, 152°33'E, 4 Feb.-9 Apr. 1993, M. Gray, G. Cassis, pitfall (AM KS39450). Queensland: 1♂; Beerwah Forestry Reserve, 26°51'S, 152°57'E, 29 Aug. 1990, M. Glover, pitfall (QMS18368); 9♂, Consuelo Pk, 7.7km W, 1120m, 24°56'S, 148°05'E, 23 Aug.- 21 Jan. 2002, C. Eddie, pitfall (QMS18368); 1♂, Consuelo Pk, 3.5km W, 140m, 24°56'S, 148°08'E, 23 Aug.-21 Jan. 2002, C. Eddie (QM S58638); 1♂, Expedition Range NP., 'Amphitheatre' camp, 560m, 25°12'S, 148°59'E, 25 Sep.-18 Dec. 1997, G. Monteith, intercept trap (QM S44448); 5♂, 9♀, Lake Broadwater, via Dalby, 27°21'S, 151°06'E, 26 Jan. 1985-Jan. 1986, M. Bennie, pitfall (QM S47623-5, S47385, S35293); 2♂, 5♀, Lake Broadwater, via Dalby, 27°21'S, 151°06'E, 2 Jan.- 25 Feb. 1986, M. Bennie, itfall (QM S15723); 9♂, Peawaddy Lkt., 2.6km W, 1120m, 24°55'S, 148°02'E, 24 Aug. 2001-21 Jan. 2002, C. Eddie, pitfall (QM S58651); 1♂ Texas, Pike Creek Dam Site, 23°05'S, 145°50'E, 9 Nov. 1973, R.J. McKay (QM S4388); 1♂, Woodford, 9.5km NEN, 26°56'S, 152°52'E, 24-25 Aug. 2002, D.J. Cook (QM S60809). Victoria: 1♂, Barmah forest, 35°56'S, 145°03'E, Jan. 2001, A. Ballinger, pitfall (QM S60810); 1♂, Bendigo, Flora Hill, 36°47'S, 144°08'E, 9-16 May 2000, Ecology students (CVIC 825); 1♂, Eppalock Res. Redesdale, 36°51'S 144°23'E, 27 Nov. 1967, A. Neboiss (VM). Western Australia: 1♂, N. of Mt Dean, 33°13'56"S, 123°38'15"E, 11 Apr. 2001, A. Baynes, leaf litter (WAM T44580), 1♂,

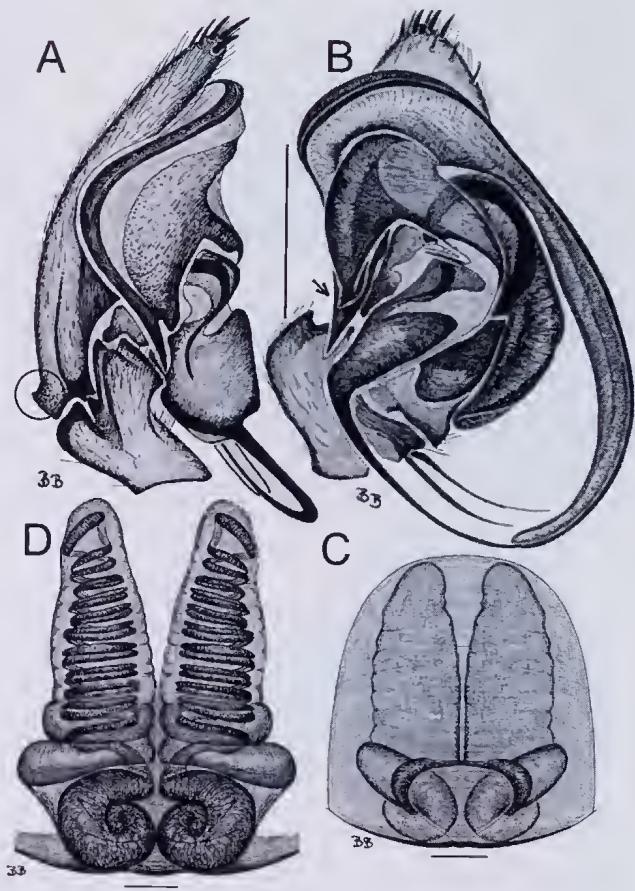


FIG. 12. *Holasteron aciculare*. A,B, right ♂ palp. A, retrolateral; B, ventral; C,D, epigyne. C, ventral; D, dorsal. Scale 0.5 mm, 0.1mm.

pitfall (QM S58649); 1♂, Consuelo Pk. 3.5km W, 140m, 24°56'S, 148°08'E, 23 Aug.-21 Jan. 2002, C. Eddie (QM S58638); 1♂, Expedition Range NP., 'Amphitheatre' camp, 560m, 25°12'S, 148°59'E, 25 Sep.-18 Dec. 1997, G. Monteith, intercept trap (QM S44448); 5♂, 9♀, Lake Broadwater, via Dalby, 27°21'S, 151°06'E, 26 Jan. 1985-Jan. 1986, M. Bennie, pitfall (QM S47623-5, S47385, S35293); 2♂, 5♀, Lake Broadwater, via Dalby, 27°21'S, 151°06'E, 2 Jan.- 25 Feb. 1986, M. Bennie, itfall (QM S15723); 9♂, Peawaddy Lkt., 2.6km W, 1120m, 24°55'S, 148°02'E, 24 Aug. 2001-21 Jan. 2002, C. Eddie, pitfall (QM S58651); 1♂ Texas, Pike Creek Dam Site, 23°05'S, 145°50'E, 9 Nov. 1973, R.J. McKay (QM S4388); 1♂, Woodford, 9.5km NEN, 26°56'S, 152°52'E, 24-25 Aug. 2002, D.J. Cook (QM S60809). Victoria: 1♂, Barmah forest, 35°56'S, 145°03'E, Jan. 2001, A. Ballinger, pitfall (QM S60810); 1♂, Bendigo, Flora Hill, 36°47'S, 144°08'E, 9-16 May 2000, Ecology students (CVIC 825); 1♂, Eppalock Res. Redesdale, 36°51'S 144°23'E, 27 Nov. 1967, A. Neboiss (VM). Western Australia: 1♂, N. of Mt Dean, 33°13'56"S, 123°38'15"E, 11 Apr. 2001, A. Baynes, leaf litter (WAM T44580), 1♂,

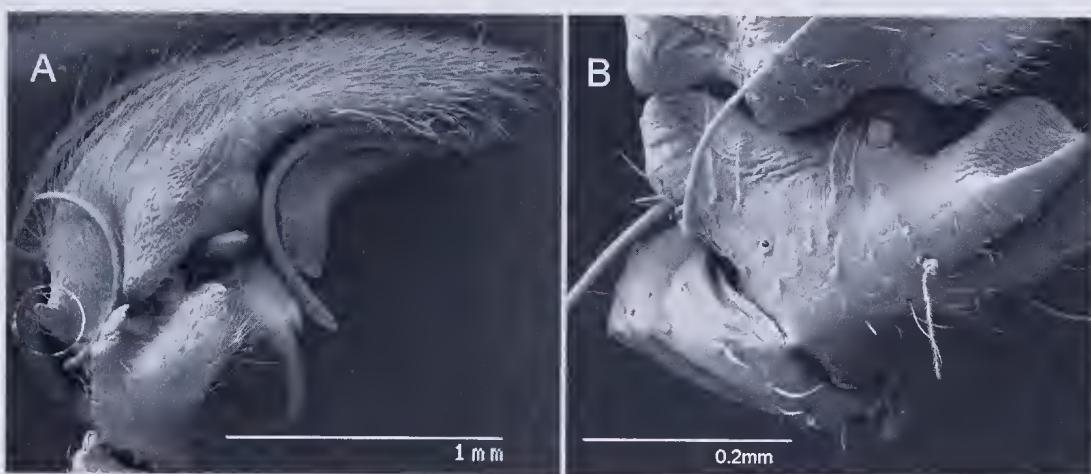


FIG. 13. *Holasteron aciculare*. A,B, right ♂ palp. A, retrolateral; B, dorsal view of tibia.

McDermid Rock, Goldfield Survey, 32°45'S, 120°02'E, 4 July 1979, R.A.How, pitfall (WAM 90/313); 2♂, Nullarbor Plain, 30°15'S, 127°43'E, Apr. 1930, C. Barrett (AM KS30355); 14♂, 3♀, Exclamation Lake, site SG 09B, 10B, 05B, 6A, 06B, 5A, 09A, 08A, 08B, 32°42'26"S, 121°29'31"E, 23-29 Apr. 2002, R. Teale et al. Dry pitfall (WAM T5432-40); 3♂, Nanambinia, 32°40'S, 123°35"E, 4-23 May 1986, B.Y. Main (WAM T54609).

DIAGNOSIS. This widespread species can be easily recognised by the cymbium with retrobasal spine in males and the female epigyne, with oval CO, u-shaped sclerotised tubes and elongate CD, coiled about 9 times.

DESCRIPTION. Male (holotype). 5.00 long. Carapace 2.60 long; 1.76 wide; 1.04 high; cl/cw 1.48; sternum 1.12 long; 0.92 wide; sl/sw 1.21; abdomen 2.40 long; 1.60 wide. Clypeus 0.48 high.

Colour: Carapace; sternum; chelicerae sepia brown; maxillae and labium medium brown, distally white. Abdomen sepia brown, dorsally with or without weak scutum, with 2-3 pairs of white spots on top, the first and second can be elongated stripes, the third horizontal and 2-3 spots in front of the spinnerets; laterally with 2 elongate white patches. Legs pale brown, annulated, with darker brown lateral stripes; coxae I-IV pale; trochantera I-IV brown; femora I-IV proximal part white, distal part pale brown.

Eyes: AME largest; eye group width 0.52 of head width; AME 0.14; ALE 0.12; PME 0.12; PLE 0.12; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.08; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.34; AME-AME 0.32; PME-PME 0.32.

Male palp (Figs 12A,B, 13A,B): Cymbium with retrobasal spine (circle), elongate MS, PE longer than cymbium and tibia; RDTA with sharp tip and strong prong, from ventral view, prong overlapping tip. That is the case in all species of the *H. aciculare*-group and will be not mentioned in the descriptions of the other species. VTiA straight, with incision; DTiA IP a small spine, EP about half as long as VTiA, with distal saddle (Fig. 13B).

Female (paratype). 4.80 long. Carapace 2.60 long; 1.80 wide; 1.16 high; cl/cw 1.44; sternum 1.20 long; 1.04 wide; sl/sw 1.07; abdomen 2.20 long; 1.80 wide. Clypeus 0.52 high.

Colour: Carapace orange brown. Sternum orange, pale brown; chelicerae orange; maxillae and labium pale brown, distally white. Abdomen sepia brown, with 2 pairs of white spots on top and 2 in front of the spinnerets; laterally with chevrons; ventrally pale brown. Legs pale brown, annulated; coxae I-IV pale; trochantera I-IV pale, or brown; femora I-IV proximal part white, distal part pale brown.

Eyes: AME largest; eye group width 0.51 of head width; AME 0.16; ALE 0.14; PME 0.14; PLE 0.14; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.10; ALE-PLE 0.04; eyes group AME-PME 0.40; AME-AME 0.34; PME-PME 0.34.

Epigyne (Fig. 12C,D): CO oval, with u-shaped sclerotised tubes, CD elongate, about 9 times coiled, axis straight. S helical and touching medially.

REMARKS: This wide spread species varies in body length from 3.8-5.00, in colour of carapace

and abdomen from orange brown to deep sepia brown, in the abdominal colour pattern from 2 pairs of white dots on top and 1 in front of the spinnerets to 3 pairs on top and 2 in front of the spinnerets, with small or strong retrobasal spine. DTiA Ep with saddle undivided or divided. Examples here mentioned are from WAM 90/313, QM S47624 Lake Broadwater, QM S4388 Texas, HT SA NN12000.

DISTRIBUTION. S and W coastal region of Western Australia, S coastal region of South Australia, Victoria, E coastal region of New South Wales and SE Queensland (Fig. 22).

Holasteron driscollii sp. nov.
(Figs 14, 22)

ETYMOLOGY. For D. Driscoll, collector of the holotype.

MATERIAL. HOLOTYPE: New South Wales: ♂, Pulletop, 33°56'S, 146°06'E, 12-18 Oct. 1999, D. Driscoll, pitfall (QM S53275). PARATYPES: New South Wales: 1 ♂, Pulletop, 34°02'S, 146°04'E, 3-8 Nov. 1999, D. Driscoll, pitfall (QM S52827); 1 ♂, Pulletop, 33°59'S, 146°05'E, 12-18 Oct. 1999, D. Driscoll, pitfall (QM S53664); 2 ♂, Taleeban, 33°58'S, 146°27'E, 12-18 Oct. 1999, D. Driscoll, pitfall (QM S53035, S53180); South Australia: 2 ♂, 1 ♀, Malinong, 35°31'S, 139°31'E, 21 Aug. 1999, J. Eckert, M. Ludewigs (SAM NN11971-73).

DIAGNOSIS. Resembling *H. marliesae* in shape of bulb and epigyne as well as in colour pattern but can be distinguished by DTiA, IP a tiny thorn, EP anvil-shaped, inner edge semicircular, serrated, half way to IP with small spine in males and in females with semicircular CO, without sclerotised tubes, with only 3 to 4 times coiled CD, axis in v-shaped position.

DESCRIPTION. Male (holotype). 3.52 long. Carapace 1.80 long; 1.36 wide; 0.76 high; cl/cw 1.32; sternum 0.76 long; 0.76 wide; sl/sw 1.00; abdomen 1.72 long; 1.16 wide. Clypeus 0.32 high.

Colour: Carapace; sternum sepia brown; chelicerae medium brown; maxillae and labium medium brown, distally white. Abdomen sepia brown, dorsally with weak scutum and 2 pairs of white spots on top and with 1 spot in front of the spinnerets or with pale chevrons; ventrally pale brown to dark brown. Legs pale brown, annulated, with darker brown lateral stripes; coxae and trochantera I-IV pale; femora I dark

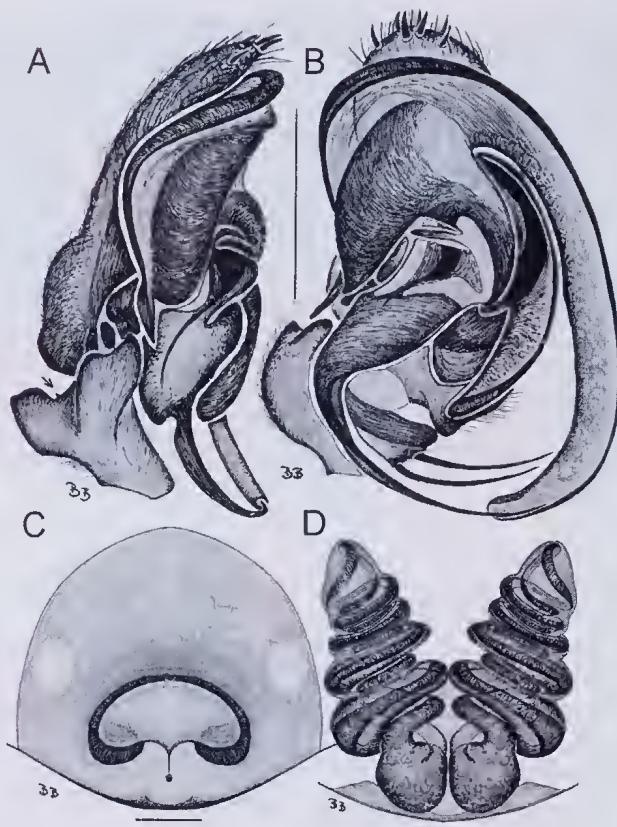


FIG. 14. *Holasteron driscollii*. A,B, right ♂ palp. A, retrolateral; B, ventral; C,D, epigyne. C, ventral; D, dorsal. Scale 0.5 mm, 0.1mm.

brown, with white patch laterally, II-IV proximal part white, distal part dark brown.

Eyes: AME largest; eye group width 0.58 of head width; AME 0.12; ALE 0.10; PME 0.10; PLE 0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.28; AME-AME 0.26; PME-PME 0.26.

Male palp (Fig. 14A,B): Cymbium with dorsal apical scopula and few strong spines, MS elongate, at least 3 times as long as wide; PE longer than cymbium and tibia. Tibia short, VTiA straight, with incision; DTiA IP a tiny thorn, EP anvil-shaped, inner edge semicircular, serrated, half way to IP with small spine.

REMARKS. The abdominal pattern can vary from 2 pairs of white dots on top and 1 spot in front of the spinnerets to pale chevrons.

Female (paratype). 4.36 long. Carapace 1.96 long; 1.32 wide; 0.84 high; cl/cw 1.48; sternum

0.86 long; 0.86 wide; sl/sw 1.00; abdomen 2.40 long; 1.48 wide. Clypeus 0.36 high.

Colour: As in male.

Eyes: AME largest; eye group width 0.58 of head width; AME 0.12; ALE 0.10; PME 0.10; PLE 0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.10; ALE-PLE 0.04; eyes group AME-PME 0.3; AME-AME 0.26; PME-PME 0.26.

Epigyne (Fig. 14C,D): CO semicircular, without sclerotised tubes, CD elongate, 3-4 times coiled, axis v-shaped, S touching medially.

DISTRIBUTION. SW New South Wales and SE South Australia (Fig. 22).

***Holasteron flinders* sp. nov.**
(Figs 15, 23)

ETYMOLOGY. Noun in apposition with the type locality.

MATERIAL. HOLOTYPE: South Australia: ♂, Flinders Ranges National Park, 31°23'S 138°38'E, H.M. Hale (SAM N199263). PARATYPES: South Australia: 1♂, Aroona Valley, Northern Flinders Ranges, 31°18'S, 138°35'E, 13 Sep 1971, J. Forrest (SAM N1992264).

DIAGNOSIS. This biggest species of the *H. aciculare*-group can easily be recognised by the yellow carapace with dark cephalic area, by the abdominal pattern with 1 pair of white spots on posterior part and 2 in front of the spinnerets and by the structure of the male palp with very short MS.

DESCRIPTION. Male (holotype). Total length 6.08 long. Carapace 3.40 long; 2.36 wide; 1.28 high; cl/cw 1.44; sternum 1.48 long; 1.28 wide; sl/sw 1.15; abdomen 2.68 long; 2.08 wide. Clypeus 0.48 high.

Colour: Carapace yellow, with dark cephalic area; sternum yellow; chelicerae medium brown; maxillae and labium pale brown, distally white. Abdomen sepia brown, dorsally with weak scutum and 1 pair of white spots on posterior part and 1 spot in front of the spinnerets. Legs pale.

Eyes: AME largest; eye group width 0.50 of head width; AME 0.20; ALE 0.18; PME 0.18; PLE 0.18; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.14; ALE-PLE 0.04; eyes group AME-PME 0.50; AME-AME 0.50; PME-PME 0.42.

Male palp (Fig. 15A,B): Tip of cymbium bent towards DTA; MS short, about 2 times as long as wide; PE longer than cymbium and tibia;

VTiA long, straight, with incision; DtiA, IP reduced to tiny knob, EP about half as long as VTiA, with saddle.

Female unknown.

DISTRIBUTION. SE South Australia, known only from type locality (Fig. 23).

***Holasteron marliesae* sp. nov.**
(Figs 16, 23)

ETYMOLOGY. For Marlies Kraenbring, who always supports me in my spirit .

MATERIAL. HOLOTYPE: New South Wales: ♂, Booti Booti NP, 32°15'S, 152°32'E, 9 Oct. 1997, L. Wilkie (AM KS84123). PARATYPES: New South Wales: 40♂, 3♀, Booti Booti NP, 32°15'S, 152°32'E, 9 Oct. 1997, L. Wilkie (AM KS59538, KS59545-49, KS59553, KS55997, KS56081); 1♂ same data (QMS63007); 1♂, Booti Booti NP, 32°19'S, 152°31'E, 15 July 1996, L. Wilkie (AM KS50445); 1♂, Elsmore, 29°48'S, 148°17'E, 25 Aug. 1992, A.F. Longbottom (WAM 93/1156); 1♀, Munmorah State Rec., 33°12'S, 151°35'E, 16 Dec. 1996, L. Wilkie (AM KS59537); 77♂, 9♀, Mummorah State Rec. 33°12'S, 151°35'E, 11 Oct. 1997, L. Wilkie (AM KS59550-52, KS55945-46, KS55917-18, KS56041, KS59539-44).

DIAGNOSIS. This species resembles *H. driscollii* in shape of bulb and epigyne as well as in colour pattern but can be distinguished by DTiA

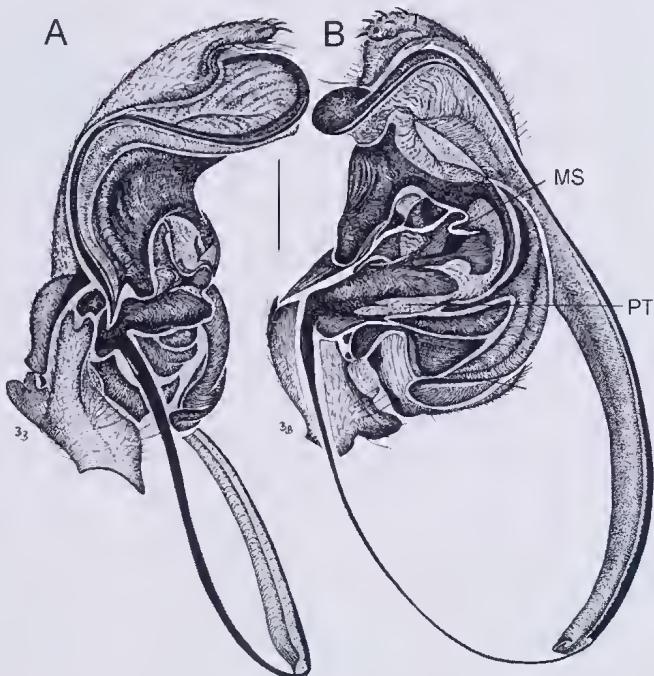


FIG. 15. *H. flinders*. A,B, right ♂ palp. A, retrolateral; B, ventral. Scale 0.5 mm.

bifurcate. VtiA, IP a tiny thorn, EP anvil-shaped, tip with internal spine. Spine and thorn in u-shaped position in males and in females with inverted flask-shaped CO, with sclerotised lip, CD about 7 times coiled and axis in straight position.

DESCRIPTION. *Male* (holotype). 3.52 long. Carapace 1.92 long; 1.44 wide; 0.88 high; cl/cw 1.33; sternum 0.88 long; 0.80 wide; sl/sw 1.10; abdomen 1.60 long; 1.12 wide. Clypeus 0.36 high.

Colour: Carapace orange brown. Sternum pale brown; chelicerae medium brown; maxillae and labium pale brown, distally white. Abdomen sepia brown, dorsally with weak scutum, 2-3 pairs of white spots on top and 1 spot in front of the spinnerets, laterally with chevrons. Legs medium brown, annulated, with darker brown lateral stripes: coxae and trochantera I-IV pale; femora I-IV proximal part white, distal part dark brown. Eyes: AME largest; eye group width 0.55 of head width; AME 0.12; ALE 0.10; PME 0.10; PLE 0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.30; AME-AME 0.26; PME-PME 0.26.

Male palp (Fig. 16A,B): Cymbium with dorsal apical scopula and few strong spines; elongate MS, at least 3 times as long as wide; PE longer than cymbium and tibia; DTiA bifurcate, IP a tiny thorn, EP anvil-shaped, tip with internal spine. Spine and thorn in u-shaped position.

Female (paratype). 4.20 long. Carapace 1.92 long; 1.32 wide; 0.88 high; cl/cw 1.45; sternum 0.92 long; 0.84 wide; sl/sw 1.09; abdomen 2.28 long; 1.68 wide. Clypeus 0.36 high.

Colour: As in male.

Eyes: AME largest; eye group width 0.56 of head width; AME 0.11; ALE 0.10; PME 0.10; PLE 0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.32; AME-AME 0.24; PME-PME 0.26.

Epigyne (Fig. 16C,D): CO inverted flask-shaped, with sclerotised lip, CD elongate about 7 times coiled, axis in straight position, S touching.

DISTRIBUTION. N New South Wales (Fig. 23).

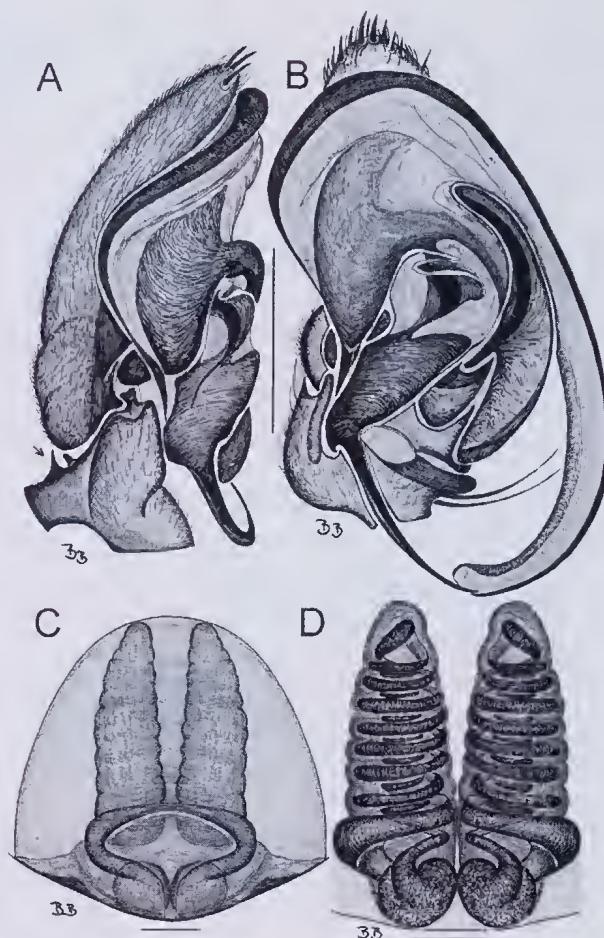


FIG. 16. *Holasteron marliesae*. A,B, right ♂ palp. A, retrolateral; B, ventral; C,D, epigyne. C, ventral; D, dorsal. Scales 0.5mm, 0.1mm.

Holasteron perth sp. nov. (Figs 2, 3D, 17, 22)

ETYMOLOGY. A noun in apposition with the type locality.

MATERIAL. HOLOTYPE: Western Australia: ♂, Talbot Road Reserve, site TR1, 31°52'S, 116°03'E, 18-31 Oct. 1993, J. Dell, pitfall dry (WAM 94/64). PARATYPES: Western Australia: 1♂, 1♀, Talbot Road Reserve, site TR1, 31°52'05"S, 116°03'04"E, 24-29 Aug. 1993, J. Dell, pitfall dry (WAM95/357-58); 1♂, 1♀, same data (QM S48700); 3♂, Talbot Road Reserve, site TR 1, 31°52'S, 116°03'E, 10-24 Oct. 1993, J. Dell, pitfall dry (WAM 94/63, 94/65-66), 1♂, Canning Well, 22°22'S, 121°18'E, July 1988, B. Harvey (MV K-3787); 1♂, Mundaring Summit Road, 31°54'S, 116°10'E, 13 Sept. 1994, A. Sampey, Photo D. Elford, film 9409-1 (WAM 94/1855); 1♂, Cape Arid, Thomas River, 34°01'S, 123°09'E, 18 Oct. 1988, C. Horseman (SAM KS29833); 1♂, Jerramungup, 34°02'S 118°55'E, Dec. 1983, G. Harold (WAM 95/319); 1♂, Perth

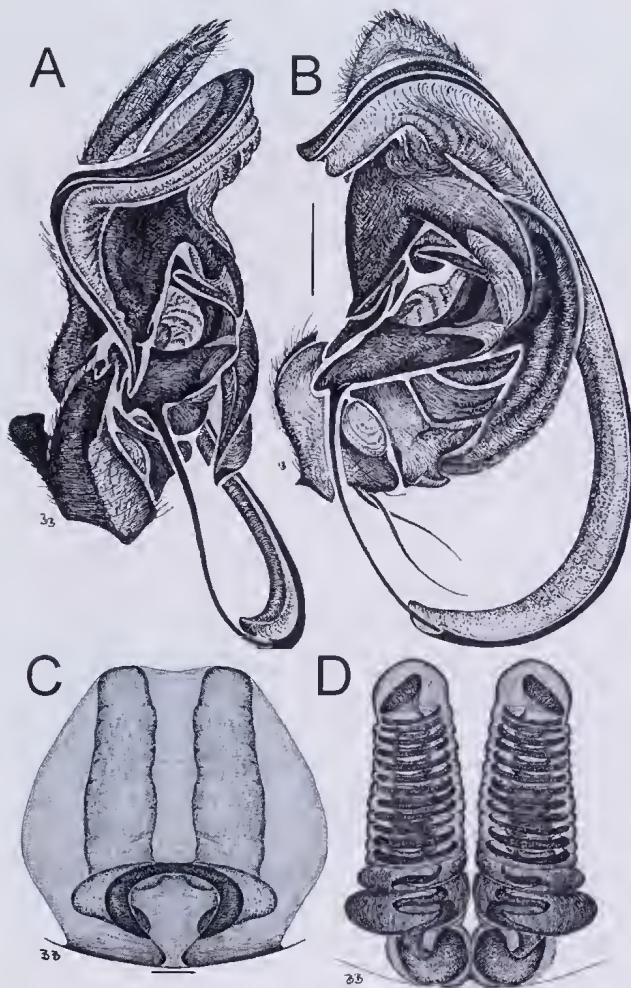


FIG. 17. *Holasteron perth*. A,B, right ♂ palp. A, retrolateral; B, ventral; C,D, epigyne. C, ventral; D, dorsal. Scale 0.5mm, 0.1mm.

Airport, site PA8, 31°59'S, 115°58'E, 24 Sep.-18 Nov. 1993, J.M. Waldock, pitfall (WAM 95/355); 1♂, Perth, Airport, site PA, 31°58'34"S, 115°58'25"E, 28 July-23 Sep. 1993, J.M. Waldock, pitfall (WAM 94/52); 3♂, Perth Airport, site PA 6, 31°58'34"S, 115°58'25"E, 24 Sep.-18 Nov. 1993, J.M. Waldock, pitfall (WAM 95/352-54); 1♂, Perth Airport, site PA 7, 31°58'34"S, 115°58'25"E, 18 Nov. 1993-7 Jan. 1994, J.M. Waldock, pitfall (WAM T54504); 2♂, Modong Nature Reserve, 32°14'S, 115°53'E, Oct.-Dec. 1997, B. Maryon et al., pitfall dry (WAM T44439).

DIAGNOSIS. Males resembles those of *H. flinders* in having the complex structure of the male palp but can be distinguished by the dark brown abdomen with 3 pairs of white spots on top and 2-3 spots in front of the spinnerets and in females by the inverted flask-shaped CO, by the

horizontal directed u-shaped sclerotised tubes and by the extremely elongate CD, coiled about 12 times.

DESCRIPTION. Male (holotype). 5.40 long. Carapace 2.72 long; 2.20 wide; 1.40 high; cl/cw 1.23; sternum 1.24 long; 1.24 wide; sl/sw 1.00; abdomen 2.68 long; 1.92 wide. Clypeus 0.6 mm high.

Colour: Carapace orange brown; sternum pale brown; chelicerae medium brown; maxillae and labium pale brown, distally white. Abdomen sepia brown, dorsally with weak scutum, 2 pairs of white spots on top, one pair of moon-shaped spots behind and 2-3 spots in front of the spinnerets; laterally with 2 elongate white patches. Legs yellow, annulated, with darker brown lateral stripes; coxae and trochantera I-IV pale; femora I-IV proximal part white, distal part dark brown.

Eyes: AME largest; eye group width 0.55 of head width; AME 0.20; ALE 0.14; PME 0.14; PLE 0.14; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.10; PME-PLE 0.14; ALE-PLE 0.04; eyes group AME-PME 0.44; AME-AME 0.42; PME-PME 0.38.

Male palp (Fig. 3D, 17A,B): MS elongate, at least 3 times as long as wide; PE longer than cymbium and tibia. Tibia short; VTIA long, straight, with incision; DTIA bifurcate, IP a tiny thorn, EP with blunt tip.

Female (paratype). 6.96 long. Carapace 2.88 long; 2.00 wide; 1.40 high; cl/cw 1.44; sternum 1.20 long; 1.20 wide; sl/sw 1.00; abdomen 4.08 long; 2.88 wide. Clypeus 0.6 mm high.

Colour: As in male.

Eyes: AME largest; eye group width 0.53 of head width; AME 0.18; ALE 0.14; PME 0.14; PLE 0.14; AME-AME 0.04; AME-ALE 0.04; PME-PME 0.1; PME-PLE 0.14; ALE-PLE 0.06; eyes group AME-PME 0.46; AME-AME 0.4; PME-PME 0.38.

Epigyne (Fig. 17C,D): CO inverted flask-shaped, with u-shaped horizontally directed, sclerotised tubes, CD extremely elongate about 12 times coiled, axis in straight position, S touching.

VARIATION. The abdominal colour pattern can vary from 1-3 pairs of dorsal dots.

DISTRIBUTION. Western Australia (Fig. 22).

Holasteron quemuseum sp. nov.
(Figs 19A,B, 23)

ETYMOLOGY. For the Queensland Museum.

MATERIAL. HOLOTYPE: Queensland: ♂, Wycheproof, site 73 (2), tree clearing, brigalow, 23°38'S, 146°51'E, 1 July 1999, T. Churchill, pitfall (QM S60886). PARATYPES: Queensland: 1♂, Wycheproof, site 73 (2), 23°38'S, 146°51'E, 1 July 1999, D. Hannah, pitfall (QM S60887); 2♂, Lake Broadwater, 27°21'S, 15°00'E, 22 Apr.-12 June 1986, M. Bennie, pitfall (QM S47383, S47384); 1♂, Oakpark, site 5(2), tree clearing, 26°04'S, 146°08'E, 26 Jan. 2000, D. Hannah, pitfall (QM S60885).

DIAGNOSIS. This species resembles *H. quemuseum* in shape of male palp but can be distinguished by the orange carapace and the abdominal colour pattern with pale chevrons.

DESCRIPTION. Male (holotype). 4.32 long. Carapace 2.28 long; 1.84 wide; 0.8 high; cl/cw 1.24; sternum 1.04 long; 1.04 wide; sl/sw 1.00; abdomen 2.04 long; 1.48 wide. Clypeus 0.52 high.

Colour: Carapace, sternum, chelicerae orange; maxillae and labium yellow, distally white. Abdomen medium brown; dorsally and laterally with pale chevrons; ventrally pale brown. Legs pale, with darker brown lateral stripes; coxae and trochanter I-IV pale; femora I-IV pale, slightly darker distally.

Eyes: AME largest; eye group width 0.60 of head width; AME 0.16; ALE 0.12; PME 0.12; PLE 0.12; AME-AME 0.02; AME-ALE 0.02; PME-PME 0.10; PME-PLE 0.10; ALE-PLE 0.02; eyes group AME-PME 0.36; AME-AME 0.34; PME-PME 0.34.

Male palp (Fig. 19A,B): Cymbium with few strong spines apically; MS elongate, at least 3 times as long as wide, PE longer than cymbium and tibia; VTiA hooked; DTiA bifurcate, IP a tiny thorn, EP slightly excavated.

Female unknown.

DISTRIBUTION. SE Queensland (Fig. 23).

Holasteron stirling sp. nov.
(Figs 18, 23)

ETYMOLOGY. A noun in apposition with the type locality.

MATERIAL. HOLOTYPE: Western Australia: ♂, Stirling Ranges NP, 12km S. Bluff Knoll, 34°29'S, 118°15'E, 23 Oct. 1989, G. Friend, G. Hall, D. Mitchell (WAM 93/886). PARATYPES: 1♂, 1♀, Stirling Ranges NP, W. of Two

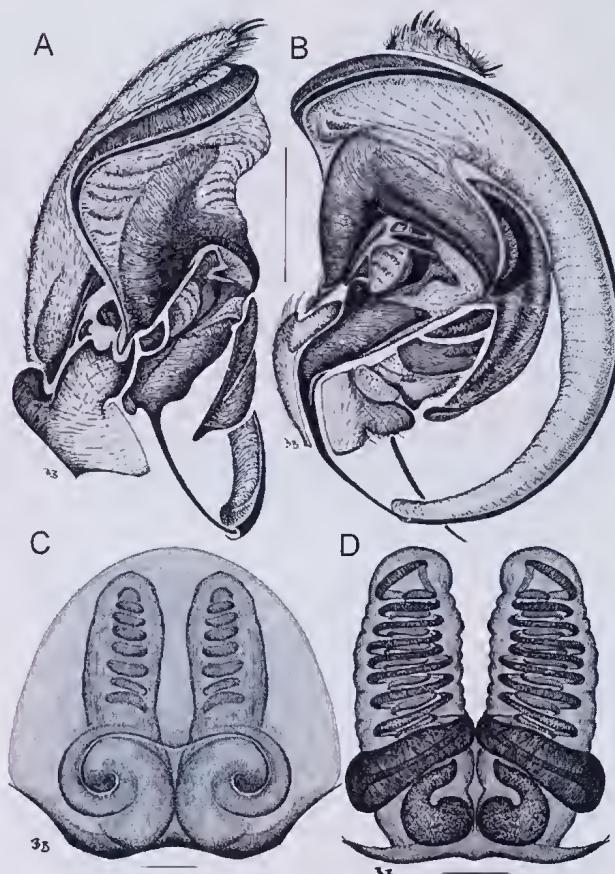


FIG. 18. *Holasteron stirling*. A,B, right ♂ palp. A, retrolateral; B, ventral; C,D, epigyne. C, ventral; D, dorsal. Scale 0.5 mm, 0.1mm.

Mile Lake, STR 1-1, 34°29'S, 118°15'E, 10-20 Sept. 1990, G. Friend pitfall (WAM T54451-2).

DIAGNOSIS. This species resembles *H. quemuseum* in shape of male palp but can be distinguished by the more semicircular DTA and the abdominal colour pattern with 3 pairs of white spots on top and 2-3 in front of the spinnerets.

DESCRIPTION. Male (holotype). 4.96 long. Carapace 2.64 long; 1.84 wide; 1.04 high; cl/cw 1.43; sternum 1.12 long; 1.08 wide; sl/sw 1.03; abdomen 2.32 long; 1.60 wide. Clypeus 0.8 high.

Colour: Carapace, sternum orange brown; chelicerae medium brown; maxillae and labium pale brown, distally white. Abdomen sepia brown, dorsally weak with scutum and 2-3 pairs of white spots on top and with 2-3 in front of the spinnerets, laterally with 1 big white patch and pale booklungs, ventrally pale brown. Legs pale, annulated; coxae and trochanter I-IV pale;

femora I-IV proximal part white, distal part dark brown.

Eyes: AME largest; eye group width 0.59 of head width; AME 0.16; ALE 0.12; PME 0.12; PLE 0.12; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.08; PME-PLE 0.1; ALE-PLE 0.04; eyes group AME-PME 0.36; AME-AME 0.34; PME-PME 0.32.

Male palp (Fig. 18A,B): MS elongate, at least 3 times as long as wide; PE longer than cymbium and tibia. Tibia short; VTiA with incision; DTiA IP reduced to tiny knob, EP about half as long as VTiA, with saddle.

Female (paratype). 4.40 long. Carapace 2.12 long; 1.60 wide; 0.88 high; cl/cw 1.32; sternum 0.92 long; 0.92 wide; sl/sw 1.00; abdomen 2.28 long; 1.72 wide; clypeus 0.44 mm high.

Colour. As in male.

Eyes. AME largest; eye group width 0.56 of head width; AME 0.13; ALE 0.12; PME 0.12; PLE 0.12; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.04; PME-PLE 0.1; ALE-PLE 0.04; eyes group AME-PME 0.32; AME-AME 0.28; PME-PME 0.28.

Epigyne (Fig. 18C,D). With two spiral-shaped CO and sclerotised lip. CD elongate, coiled about 7 times, axis in straight position, S contiguous.

DISTRIBUTION. SW Western Australia. Known only from Stirling Ranges NP. (Fig. 23).

Holasteron wamuseum sp. nov. (Figs 19C,D, 23)

ETYMOLOGY. For the Western Australian Museum.

MATERIAL. HOLOTYPE: Western Australia: ♂, Perth Airport, site PA7, 31°58'34"S, 115°58'25"E, 24 Jun-28 July 1993, J.M. Waldock et al. (WAM TS4503).

DIAGNOSIS. This species resembles *H. quemuseum* in shape of male palp but can be distinguished by the dark brown carapace, the abdominal colour pattern with 2 pairs of white spots and 1 spot in front of the spinnerets.

DESCRIPTION. Male (holotype). 3.48 long. Carapace 1.88 long; 1.36 wide; 0.96 high; cl/cw 1.38; sternum 0.84 long; 0.84 wide; sl/sw 1.00; abdomen 1.60 long; 1.20 wide. Clypeus 0.52 high.

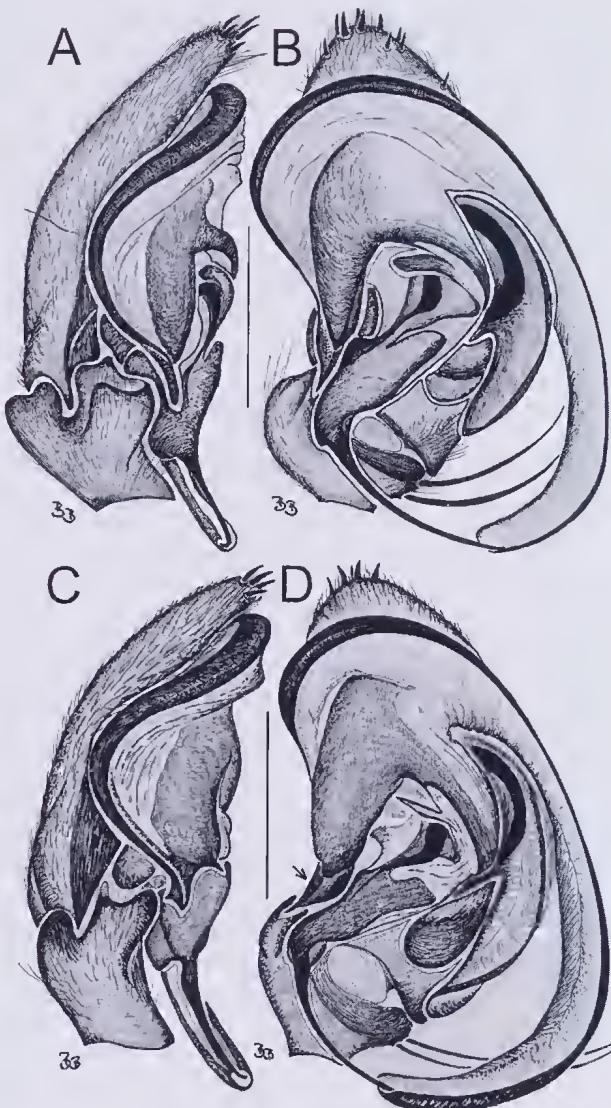


FIG. 19. *Holasteron* spp. right ♂ palps; A,C, retrolateral; B,D, ventral. A,B, *H. quemuseum*; C,D, *H. wamuseum*. Scale 0.5mm.

Colour: Carapace and sternum sepia brown; chelicerae medium brown; maxillae and labium medium brown, distally white. Abdomen sepia brown, dorsally with 2 pairs of white spots on top and 1 in front of the spinnerets; laterally with 1 big white patch and pale booklungs. Legs pale brown, with darker brown lateral stripes; coxae and trochanter I-IV pale, femora I-IV proximal part white, distal part dark brown.

Eyes: AME largest; eye group width 0.52 of head width; AME 0.12; ALE 0.10; PME 0.10; PLE

0.10; AME-AME 0.02; AME-ALE 0.04; PME-PME 0.06; PME-PLE 0.08; ALE-PLE 0.04; eyes group AME-PME 0.30; AME-AME 0.26; PME-PME 0.26.

Male palp (Fig. 19C,D): Cymbium with few strong spines apically; elongate MS; PE longer than cymbium and tibia; RDTA consists of sharp tip with broad sail and strong prong. VTiA with incision; DTiA IP reduced to tiny knob, EP about half as long as VTiA, with saddle.

Female unknown.

DISTRIBUTION. Known only from Perth Airport (Fig. 23).

DISCUSSION

With this seventh systematic paper, the *Asteron*-complex (Baehr and Jocqué, 1996) now contains 13 genera with 112 species.

The 16 described species of *Holasteron* are medium-sized (2.8–7.00 mm body length) and highly uniform in body shape, with broad oval carapace (Figs 1,2), maxillae without serrula, chelicerae without teeth, heart-shaped sternum and oval abdomen with a sclerotised tracheal spiracle (Fig. 4B) like all species of the *Asteron*-complex.

RECONSTRUCTED PHYLOGENETIC RELATIONSHIPS. The data matrix of 10 characters and 7 taxa (Tables 1, 2) was analysed with Hennig86 version 1.5 (commands: m*, bb**, tp display*) (Farris, 1988) and with NONA 2.0 (commands: amb- mult*1000) (Goloboff 1997). I analysed the data using unordered character states. Both programs generated the same single tree (length 15, consistency index 1.00 and retention index 1.00, Fig. 25). The cladogram of proposed relationships was created by hand with the same data using the original methods of Hennig (1966); this generated the same results (Fig. 25).

Basasteron leucoseum, *Euasteron enterprise* and *Spinasteron sanford* were selected as the outgroup taxa for comparison with the three species-groups of *Holasteron*.

I used only characters that I considered homologous and in which I was able to determine plesiomorphic and apomorphic character states. Based on these character states, I attempted to deduce the phylogenetic history of species-groups, detecting monophyletic clades (Hennig, 1966; Sudhaus & Rehfeld, 1992, p.137). Watrous & Wheeler's (1981) technique utilising outgroup comparison in phylogenetic analyses was taken to determine the polarity of the character states employed in this study.

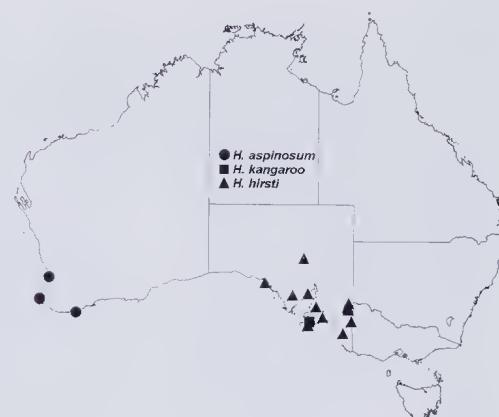


FIG. 20. Records of the *H. aspinosum*- and *H. hirsti*-group in Australia.

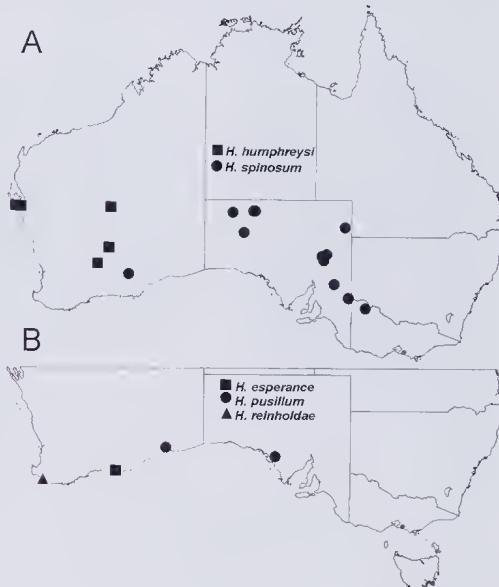


FIG. 21. Records of the *H. spinosum*-group in Australia.

Sometimes it is difficult to decide if characters or character states can be used as apomorphic characters, either because the direction of character development is doubtful or because it is unknown, whether and how many times the character states convergently evolved. Characters such as body shape or colour pattern, that are otherwise important for species identification are therefore difficult to use in the phylogenetic analysis.

In contrast to the genus *Tropasteron* where most of the species can be separated only with small differences in palpal characters and/or in

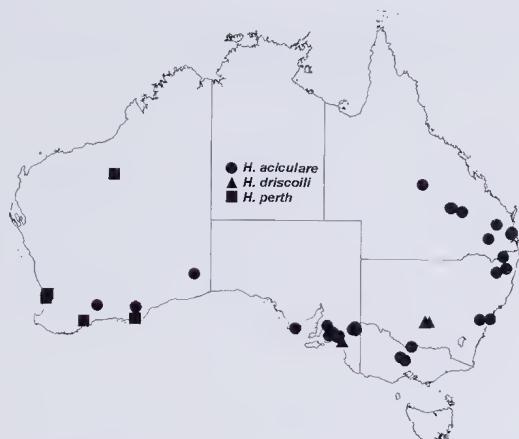


FIG. 22. Records of the *H. aciculare*-group in Australia.

abdominal colour pattern, in the genus *Holasteron* the differences are well defined and the palpal characters show increasing complexity.

The *Holasteron* species are characterised by their eye pattern with the eyes in 3 rows (2/4/2) and with AME always largest or at least equal to other eyes, in which they resemble the species of *Spinasteron*. The increase in size of the AME seems to be derived but happened presumably convergently at least three times in the *Asteron*-complex (some species of *Euasteron*, almost all species of *Spinasteron* and *Holasteron*). Nevertheless, as in most Australian zodariid genera (Baehr & Jocqué, 1996, 2000, 2001, Jocqué & Baehr, 2001), the definition of the genus *Holasteron* as a monophyletic unit, has been based on genitalic characters, especially of male palps (Fig. 25).

The main synapomorphies for the genus *Holasteron* are the flange with rounded extension, bent inside (2/3) and the additional prolateral transparent field (PTF) (4/1) at the base of the embolus. The 3 most plesiomorphic species without spine-shaped membrane and base of embolus not bent inside seem to be the *H. aspinosum*-group with the transbasal embolic area (TBE) flattened as its synapomorphy.

The *H. spinosum*- and *H. aciculare*-groups form a monophyletic unit supported by: (5/1) Base of embolus directed baso-laterad or retrolaterad, (6/1) base of embolus bent inside and 8/1 the presence of spine-shaped membrane at the base of DTA (MS).

The *H. spinosum*-group consists of 5 species and form the basal sister-group to *H. aciculare*-group with dorsoventral flattened palps and less

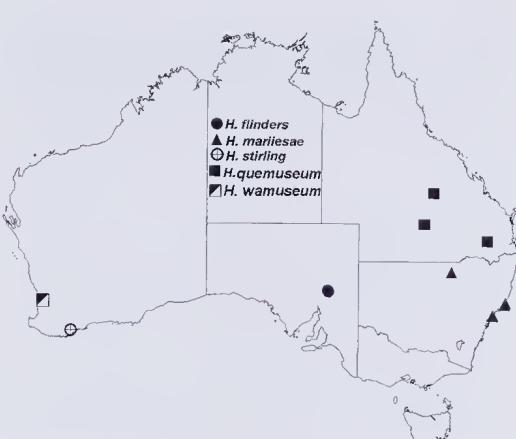


FIG. 23. Records of the *H. aciculare*-group in Australia.

number of coils of the copulatory duct (CD) in epigynes.

The 8 most derived species belong to the *H. aciculare*-group with a complex three-dimensional palp. As a consequence of that, the RDTA is folded behind the prong (9/2, Fig. 15A). The embolus is extremely long and accompanied by a long and ellipsoid prolateral extension of DTA (PE) (10/4) (Table 1). This increase of complexity happens in derived species of *Euasteron* and *Habronestes* as well and is well known as a normal phenomene in the evolution of spider palps Jocqué & Baert (2002), mentioned in the revision of the genus *Tenedos*. The basal structure of the epigyne with coiled copulatory ducts, is similar to that of *Euasteron*, and *Spinasteron* species. But, as in male palps of the *H. aciculare*-group

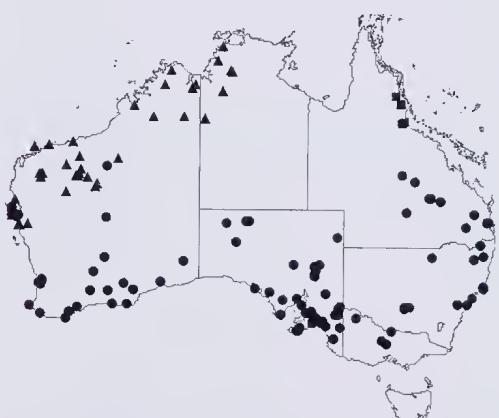


FIG. 24. Records of the *Holasteron*, *Spinasteron* and *Tropasteron* in Australia.

TABLE 1. Characters and character states of the *Holasteron* species-groups and their outgroups *Basasteron leucosenum* (Rainbow, 1920) and *Euasteron enterprise* (Baehr, 2003) and *Spinasteron sanford* (Baehr, 2003).

Male palp		
0. Retrolateral cymbial flange small bump or extension (RE). <i>0.</i> absent. <i>1.</i> present.		
1. Retrolateral cymbial flange (RE). <i>0.</i> rectangular. <i>1.</i> small bump <i>2.</i> with rounded extension. <i>3.</i> with rounded extension, bent inside.		
2. Base of embolus prolaterad with flattened chitinous plate <i>0.</i> absent. <i>1.</i> present.		
3. Base of embolus with additional prolateral transparent field (PTF). <i>0.</i> absent. <i>1.</i> present		
4. Base of embolus. <i>0.</i> directed basally. <i>1.</i> directed baso-laterad or retrolaterad.		
5. Base of embolus bent inside. <i>0.</i> absent. <i>1.</i> present.		
6. Transbasal embolic area (TBE). <i>0.</i> thin cylindrical. <i>1.</i> flattened.		
7. Spine-shaped membrane at the base of DTA (LTA) (MS). <i>0.</i> absent. <i>1.</i> present.		
8. RDTA tip and membranous lamella (ML) or prong (PR) <i>0.</i> straight. <i>1.</i> distally bent prong. <i>2.</i> RDTA tip behind prong, from ventral view.		
9. Prolateral extension (PE) length. <i>0.</i> Short about $\frac{1}{4}$ of circle. <i>1.</i> long about $\frac{1}{2}$ of circle <i>3.</i> about $\frac{3}{4}$ of circle. <i>4.</i> extremely long ellipsoid.		

All character states are unordered.

emboli became longer the copulatory duct (CD) increases in number of coils.

PHYLOGENY AND BIOGEOGRAPHY. Most zodariid species in Australia, especially of the *Asteron*-complex, are endemic to small areas, sometimes even only to a single rainforest block (e.g. *Tropasteron* Baehr, 2003b).

Holasteron includes 16 species that were found to belong to 3 species-groups. Whereas *Spinasteron* is restricted to NW Australia, *Holasteron* is distributed over SE, S and SW of Australia but is not recorded from the Northern Territory or NW Australia (Fig. 24).

1) The species of the most basal, *H. aspinosum*-group, are restricted to South Australia (*H. hirsti*, *H. kangaroo*) and SW Western Australia (Fig. 20).

2) The most basal species (*H. pusillum*) of the more derived *H. spinosum*-group is found only in South Australia and SE Western Australia. The other 4 species are distributed in South Australia and Victoria (*H. spinosum*) and SW Western Australia (*H. esperance*, *H. hirsti*, *H. reinholdae*) (Fig. 21).

TABLE 2. Character matrix for *B. leucosenum*, *E. enterprise*, *S. sanford* and all *Holasteron* species-groups.

	0-4	5-9
<i>B. leucosenum</i>	00000	00000
<i>E. enterprise</i>	12100	00000
<i>S. sanford</i>	11100	00000
<i>H. aspin-gr. hirsti</i>	13010	00000
<i>H. aspin-gr. aspinosum</i>	13010	00000
<i>H. spinosum-group</i>	13011	10103a
<i>H. aciculare-group</i>	13011	10124

3) The 8 most derived *Holasteron* species of the *H. aciculare*-group (*H. aciculare*, *H. driscotti*, *H. flinders*, *H. marliesae*, *H. perth*, *H. stirling*, *H. quemuseum* and *H. wamuseum*) have the widest distribution from S Queensland, to New South Wales, Victoria, South Australia and SW Western Australia (Figs 22, 23).

There is no evidence that the *Asteron*-group occurs outside Australia and each genus seems to be the result of independent radiations within the Australian continent.

The most basal species of the *Asteron*-complex (*Pentasteron simplex*, *Basasteron leucosenum* and *Euasteron enterprise*) are located in S Queensland and New South Wales. *Spinasteron* is, according to the phylogenetic analysis, a derived sister-genus of *Euasteron* (Baehr, 2003a). Species of *Euasteron* are found throughout Australia, species of *Spinasteron* are restricted to the faunal refugia of the Hamersleyan subregion in the most western part of Western Australia and of the Arnhemian and Kimberleyan subregions of Northern Australia mentioned in (Baehr, 1992), whereas *Holasteron* is distributed over SE, S and SW Australia.

The progressive complexity of the male palps within *Holasteron* follows a definite biogeographical pattern with South Australia in the centre, those species with a simple palp occur in South Australia and SW Western Australia, only. Those species with more complex palps have a much larger distribution occurring from Queensland to SW Australia (e.g. *H. aciculare*). This progressive complexity tracking biogeographic zonation from a centre to two directions (east-west), is not matched in other zodariid genera studied to date. For example, in *Tropasteron*, which is distributed throughout the rainforest pockets of E Queensland, no evolutionary pattern is evident and it was hypothesised that a series of small, parallel evolutionary changes occurred

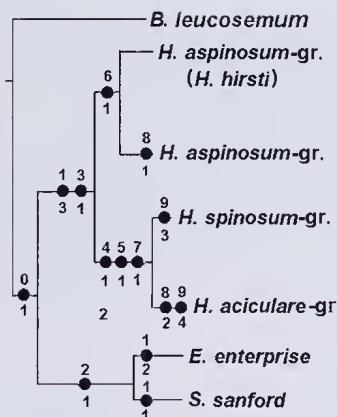


FIG. 25. Phylogeny of *Holasteron* species-groups, based on data set in Table 2. Cladogram of supposed relationships in sense of Hennig (1966), consistent with Hennig 86 and NONA (each of lengths 15, consistency index 1.00, retention index 1.00).

between the species along the entire length of the generic distribution (Baehr, 2003b).

ACKNOWLEDGEMENTS

I thank Mark Harvey, Julianne Waldock (Western Australian Museum), David Hirst (South Australian Museum), Graham Milledge (Australian Museum) for loan of the material and great support of the work. For providing critical comments on the manuscript I am most grateful to Geoff Monteith, Valerie Davies and Robert Raven (Queensland Museum). Robert Raven transferred the data to Hennig 86 and NONA and supported me with the scanning electron microscope as well. I would like to thank Valerie Davies for an excellent working atmosphere and my children, Johanna and Ursula, for being patient.

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- B. leucosenum**

H. aspinosum-gr.
(*H. hirsti*)

H. aspinosum-gr.

H. spinosum-gr.

H. aciculare-gr.

E. enterprise

S. sanford

FIG. 25. Phylogeny of *Holasteron* species-groups, based on data set in Table 2. Cladogram of supposed relationships in sense of Hennig (1966), consistent with Hennig 86 and NONA (each of lengths 15, consistency index 1.00, retention index 1.00).

between the species along the entire length of the generic distribution (Baehr, 2003b).

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